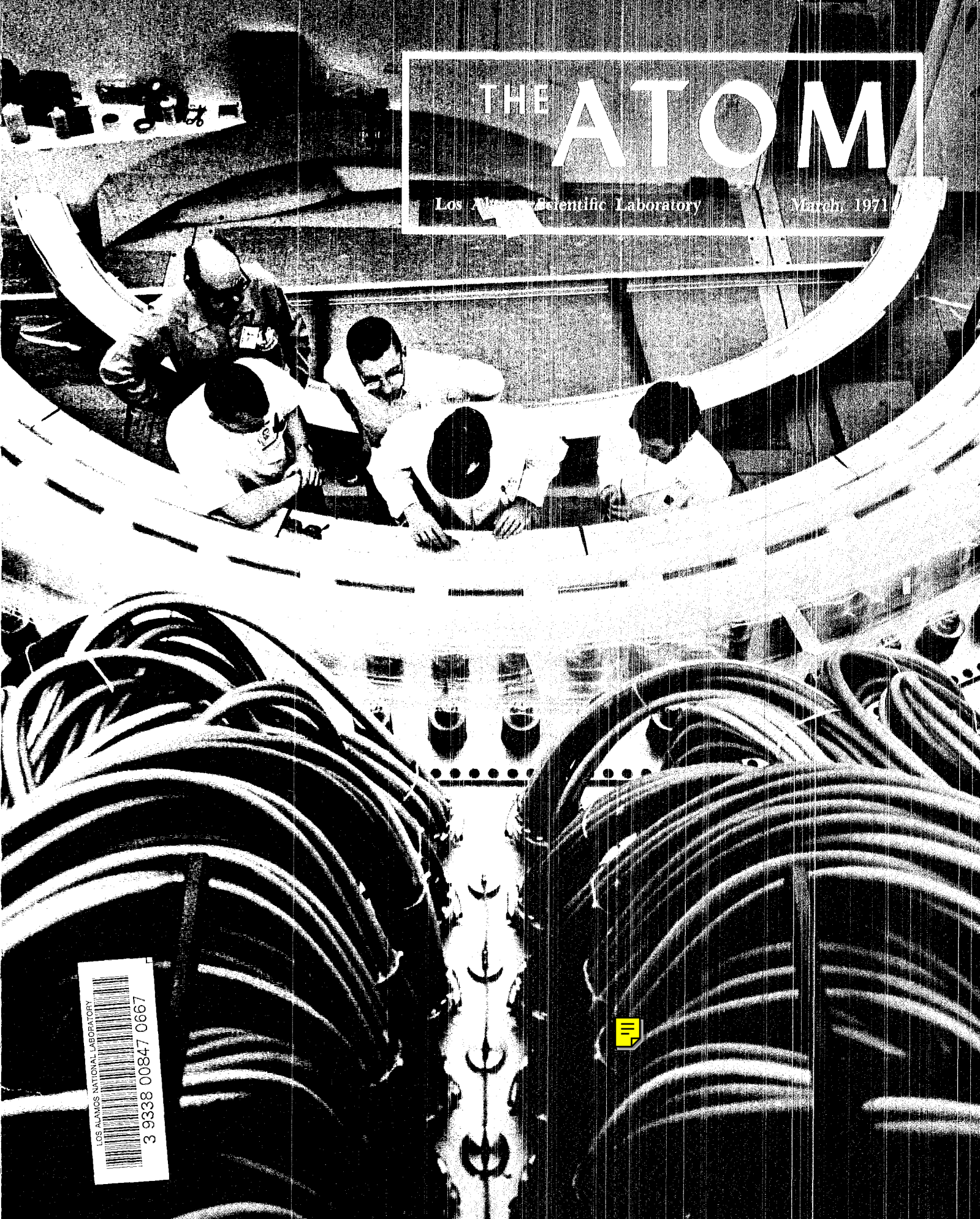


THE ATOM

Los Alamos Scientific Laboratory

March, 1971



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THE ATOM

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COVER:

The cover photograph, taken by ISD-7 Photographer Bill Jack Rodgers, shows members of Group P-15 installing the first of three sectors of Scyllac's torus. The first sector of Scyllac was turned on in February and experiments are now underway to investigate some primary characteristics of hot plasma behavior. The story begins on page one.

Big Steps in Sherwood

By Charles Mitchell

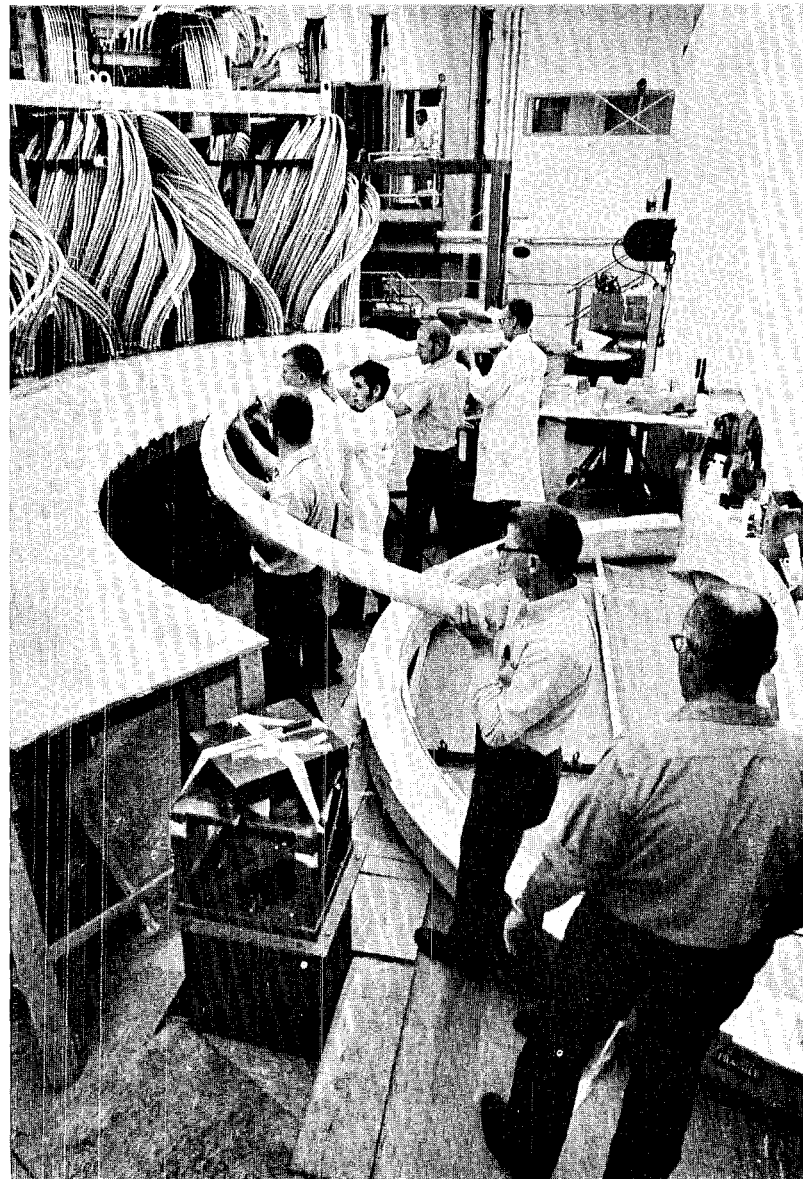
Since the Los Alamos Scientific Laboratory started work in controlled thermonuclear reactions in 1952, it has become a recognized world leader in the production, study and containment of pulsed high density, very high temperature plasmas. Los Alamos researchers produced the first confirmed controlled thermonuclear reaction in 1957 and are now, with Scyllac and the Shock Heated Toroidal Z-Pinch device, moving toward sustaining such reactions at high temperatures for longer times. When these goals are attained—and they might be with either of the new devices—we will be much closer to useable power production with controlled thermonuclear reactions.

LASL scientists have reached something of a milestone in their progress in fusion studies at Project Sherwood. Sherwood (the name of the project encompassing the Laboratory's CTR, or fusion reaction, work) "turned on" the first of three sectors of Scyllac in February. Witnessing the event were members of the Atomic Energy Commission's General Advisory Committee. This committee is essential in setting directions and priorities for future research.

Scyllac, in its final form, will be a large toroidal (doughnut shaped) device using the theta pinch principle to compress an ionized gas (plasma). This kind of pinch exerts a magnetic force which "squeezes" a column of plasma uniformly, keeping the plasma compressed (which maintains the high temperature of more than 50 million degrees), and keeping it away from the walls of the torus.

The torus—a doughnut-shaped quartz tube—will be about 49 feet in circumference and about

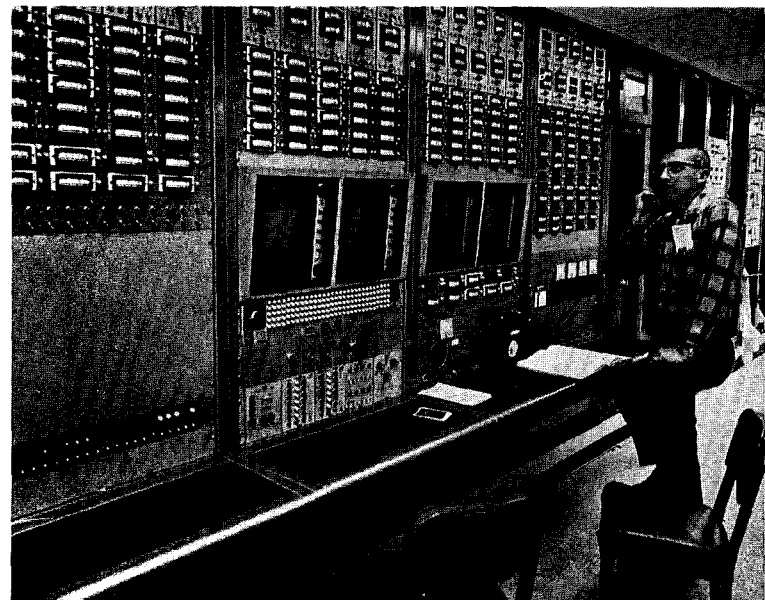
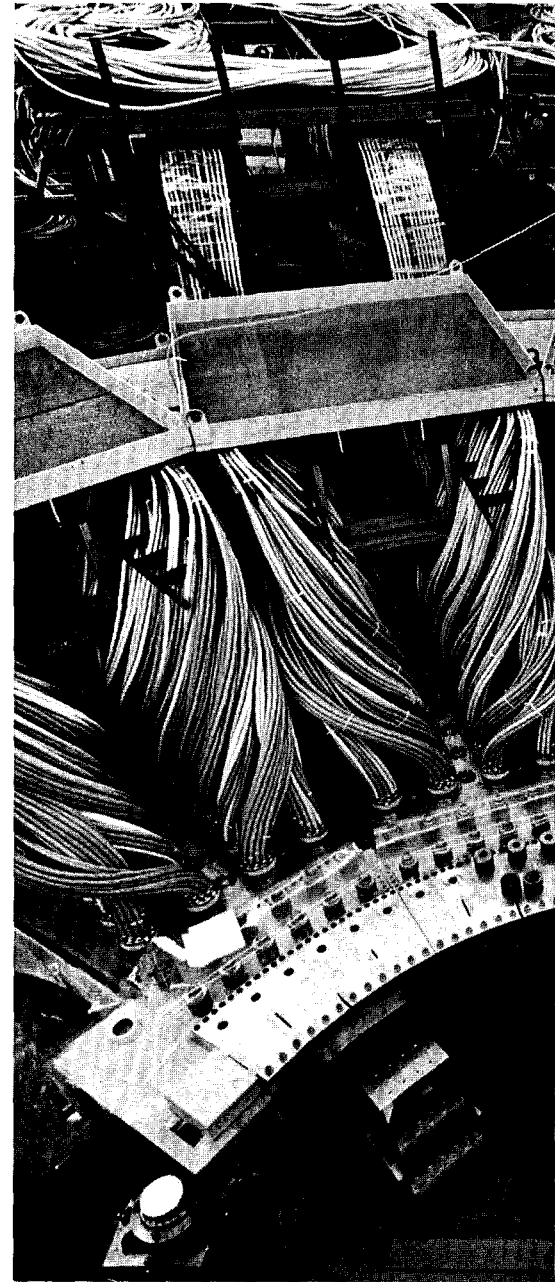
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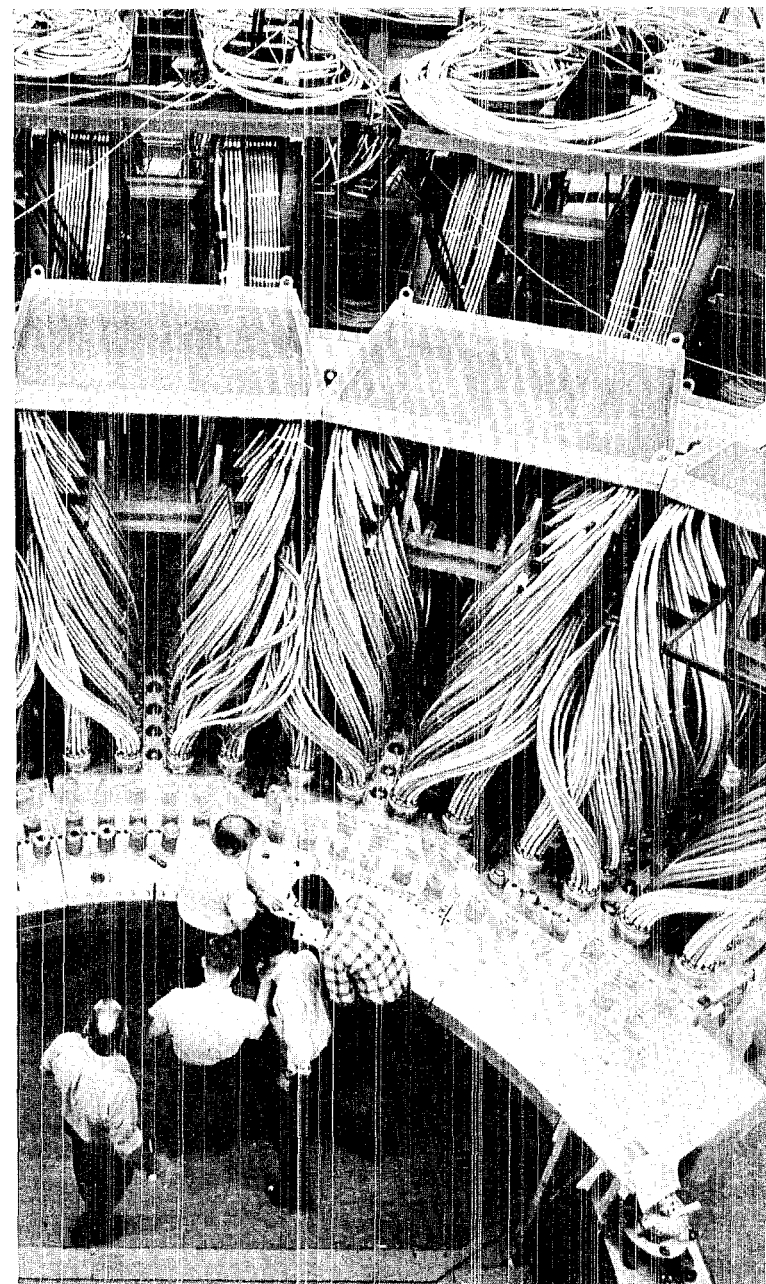


The 16-foot-long quartz tube for Scyllac's first sector is lifted into the bottom half of the compression coil.



Left, Bill Ellis, Warren Quinn and Horris Crane, all of P-15, put one of the top pieces of the compression coil in place. In background, Ed Little, also of P-15 tightens bolts that tie the two sections of the compression coil together. Below, Dave Weldon and George Sawyer, both of P-15, check adjustments and teletype printout in the computer room.





Above, members of P-15 work toward installation of one-third of the quartz torus in Scyllac's first sector. Left, Quinn talks on the phone from Scyllac's operator console.

16 feet in diameter. This quartz torus will have clamped around it, in a continuous ring, aluminum compression coils which will deliver the energy of more than 3,000 energy storage capacitors to the torus simultaneously. This energy will create the theta pinch.

Experiments were started in February to investigate some primary characteristics of hot plasma behavior. In April, the Scyllac researchers will add some metal coils around the quartz sector to study the final magnetic field behavior and its effect on the plasma.

Actually Scyllac is only one third complete. The quartz tube is now open on both ends and curved since it is one third of a complete circle. This curved sector is about 16 feet long. The primary energy-storage bank of this sector contains 1,050 energy storage capacitors.

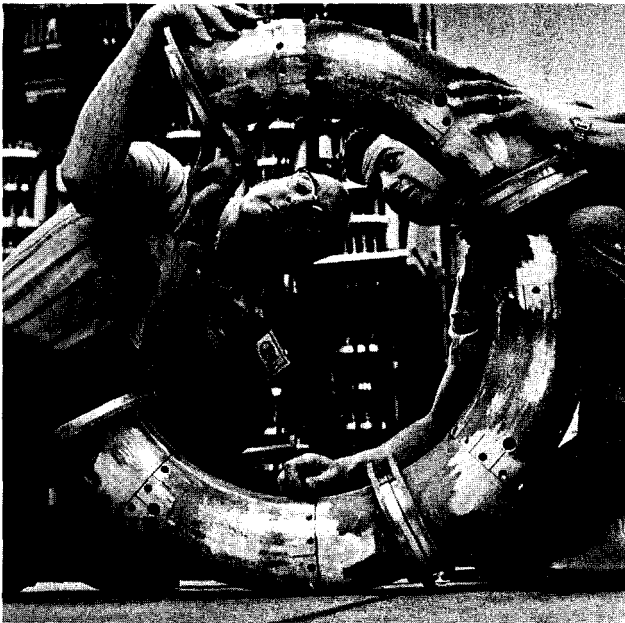
Work with this sector of Scyllac will provide researchers with valuable information on the behavior of plasma when it is compressed along a curved path instead of in a straight line as in its predecessor, Scylla IV.

P-14, one of the groups in Sherwood, expects to complete its device—the Shock Heated Toroidal Z-Pinch device—in March. This will be of equal interest to the overall CTR program since it operates on a different principle with the same goals in mind, namely high temperature plasma containment for long times.

P-14's device is also toroidal. But, its torus is only 30 inches in diameter (instead of 16 feet) and its energy storage banks contain only about 250 capacitors since its energy requirement is 60 times less.

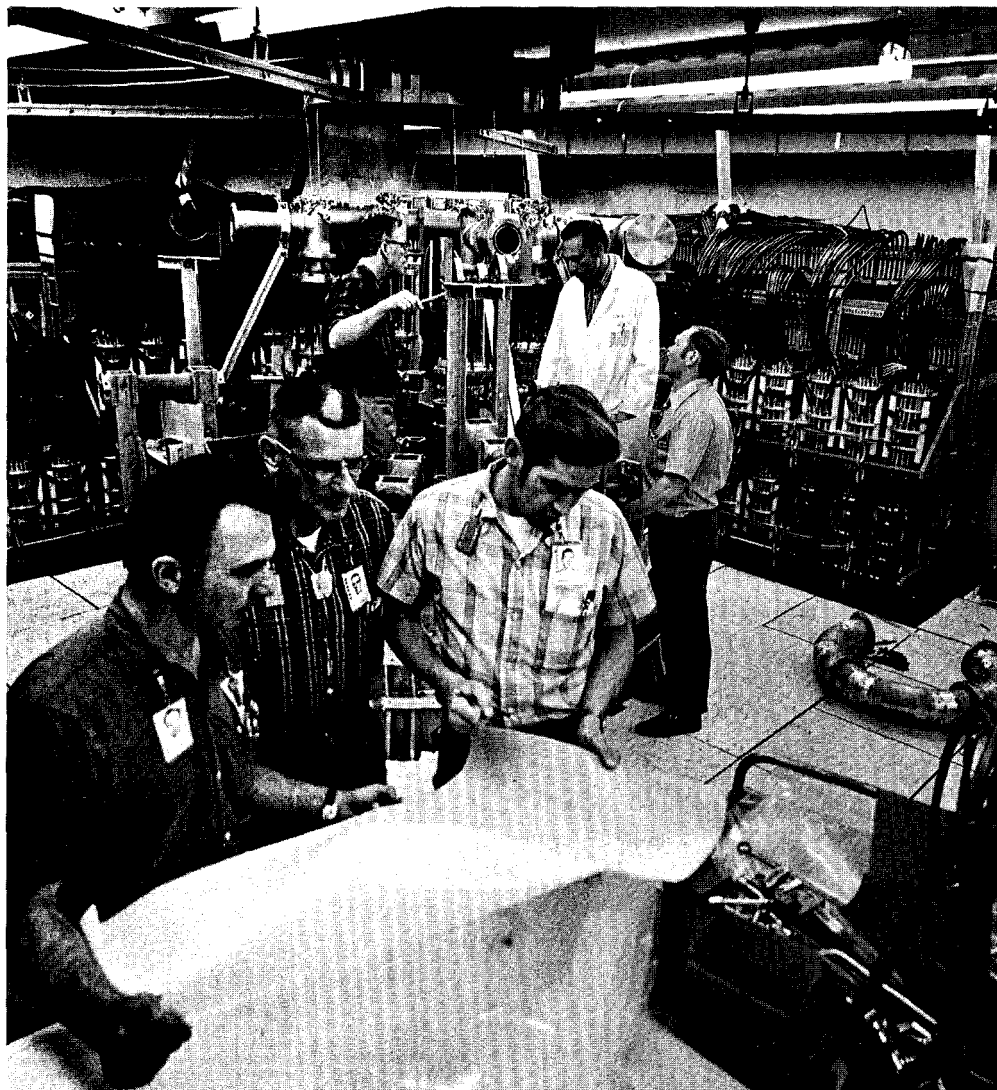
The operating principle is also different. Basically, the ionized gas is compressed, or held together, by inducing a large electrical current in and parallel to the plasma column, rather than squeezing it from the outside. A magnetic field similar to the Scyllac theta pinch is also used to make the plasma column more stable.

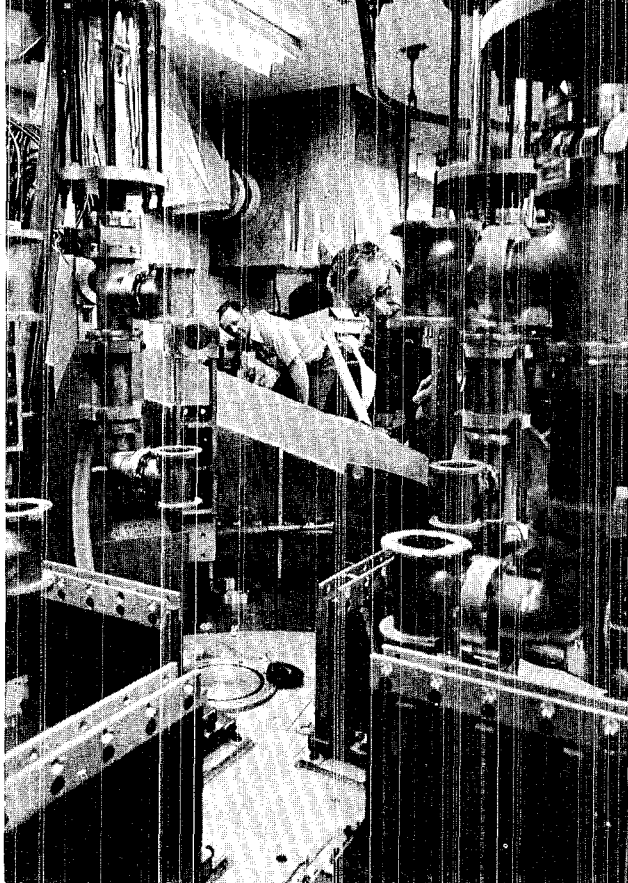
The quartz torus of the Z-pinch device is placed in a metal, electrically conducting container. The combination of various forces, in essence, makes it harder for the hot plasma to disperse the harder it tries. Instead of having the aluminum compression coils of Scyllac clamped around the torus, the Z-pinch device passes through four sets of massive iron rings. These rings induce a very high electrical current inside



Left, Al Schofield and Dave Jardine, both of P-14, check the assembly of the metallic container for the ceramic torus to be used on the Shock Heated Toroidal Z-Pinch device.

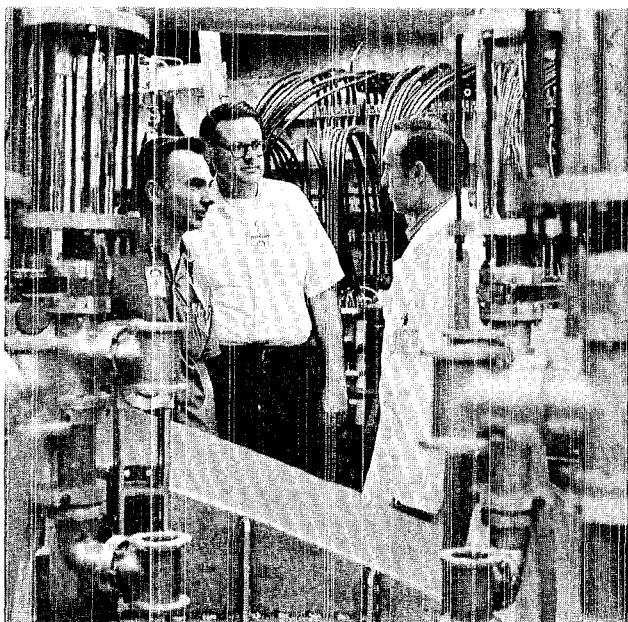
Louis Burkhardt, Robert Holm and Jardine, all of P-14, look over the drawings of the control chassis while Bob Dike, P-16, Joe DiMarco, P-14, and Charlie Charlton, P-16, work on the Z-pinch vacuum system in background.





Charlton and Dike use a surveyor's transit to align some of the parts of the Z-pinch device.

Burkhardt and Pete Forman, P-14, talk to DiMarco in front of one of the capacitor banks which will supply energy to the Z-pinch device.



the torus and it is this induced current that helps contain and compress the plasma.

The LASL fusion program started in 1952 with a Z-pinch device called the "Perhapsatron." While the Z-pinch seemed to have a great deal of promise, because all of the plasma pressure isn't transmitted to the container (torus) and it offers more plasma containment per unit of magnetic energy than other devices, the first simple Z-pinch device proved to be violently unstable.

In 1956-58, a theory was developed which predicted stability (the plasma would not break down and lose its heat) for the devices using a magnetic field along the plasma column instead of around it and having an electrically conducting wall close to the pinch. Experiments with this revised Z-pinch at LASL and other laboratories showed that difficulties cropped up which were so fundamental that, rather than work on solutions at that time, the Z-pinch program was dropped in favor of more promising areas.

In 1966, the Laboratory became interested in Z-pinches again and looked carefully at the problems in the early experiments. The researchers realized that theta pinches (such as Scylla) were heated initially by a strong "shock" caused by the rapidly rising magnetic containment field. It was decided that heating Z-pinches the same way was possible. Using a new technology, called magnetic energy storage, a linear, or straight Z-pinch proved the shock heating theory. The results of this linear experiment demonstrated that sufficiently stable hot, dense plasmas can be produced in the Z-pinch. From that point construction of the Shock Heated Toroidal Z-Pinch device began.

The completion of the new Z-Pinch device and Scyllac and continuation of the work done with them is heartening in light of the world's energy reserves. The reserves of substances which give us the power to run our world are disappearing rapidly. Experts calculate, based on numbers derived from population and energy demands in the near future, that our known fossil fuels (coal, gas and oil) reserves will be gone in eight years; that if we discover a maximum of new fossil fuel sources, it will be enough for only 160 years; that current nuclear power plants (producing power through the nuclear fission process) have enough cheap and easily obtainable fuel for only 100 years; and that nuclear power reactors using all possible fuels (fuels we haven't even learned how to extract yet) can have enough fuel for about one

continued on next page

million years. Yet fusion reactors of the type which might evolve from Scyllac and the Z-pinch device now have enough easily available fuel (extracted from sea water) to provide power for a growing world for over two billion years. It would appear that the one-million-year reserve for present nuclear power plants should be enough to calm anyone's fears, but that isn't so. The cost of obtaining such fuel by as yet unknown processes may prove to be so expensive, if not impossible, that the expected reserves could easily drop to a few thousands of years.

It has been argued for some time that nuclear energy, fission or fusion, is essential to the future of mankind. Fission energy, such as that provided by conventional nuclear power plants, is flourishing. Fusion energy is not yet here, but would have substantial advantages over fission.

Our alternatives to nuclear power are almost nonexistent. We have essentially reached the limit of our ability to produce hydroelectric power. There are simply not enough rivers to dam up. Solar power, such as that produced by panels of solar batteries, is not limited by the amount of sunlight, but by the size and output limits of the solar batteries and other such devices. At present, that leaves us with fission (producing power in conventional breeder and non-breeder reactors all over the world) and fusion (the controlled thermonuclear reactor).

The four "negative" points always thrown up at fission reactors, whether completely true or not, are: safety, possibility of a misappropriation of fissionable fuels, waste product disposal, and thermal pollution. How do these drawbacks relate to fusion power reactors?

It is generally thought that fusion reactors will be safer than fission reactors for many reasons. When producing power, the fusion reactor will generate no biologically harmful products such as iodine-131 and strontium-90. Tritium is involved but it dissipates into the atmosphere very rapidly so that a heavy accidental release would be less hazardous than possible releases of fission products from conventional nuclear power plants. In addition, it is impossible for a fusion reactor to "runaway."

Using tritium as fuel would completely remove any fear of misdirecting nuclear fuels which might be used for weapons. "It is hard to see what a thief would do with it other than sell it to a clandestine fusion power plant operator," said Jim Tuck, P-division associate leader.

The last two negative points are easily dismissed. Fusion power plants would produce no waste products to dispose of and thermal pollution would be no more than that produced by any other nuclear power plant.

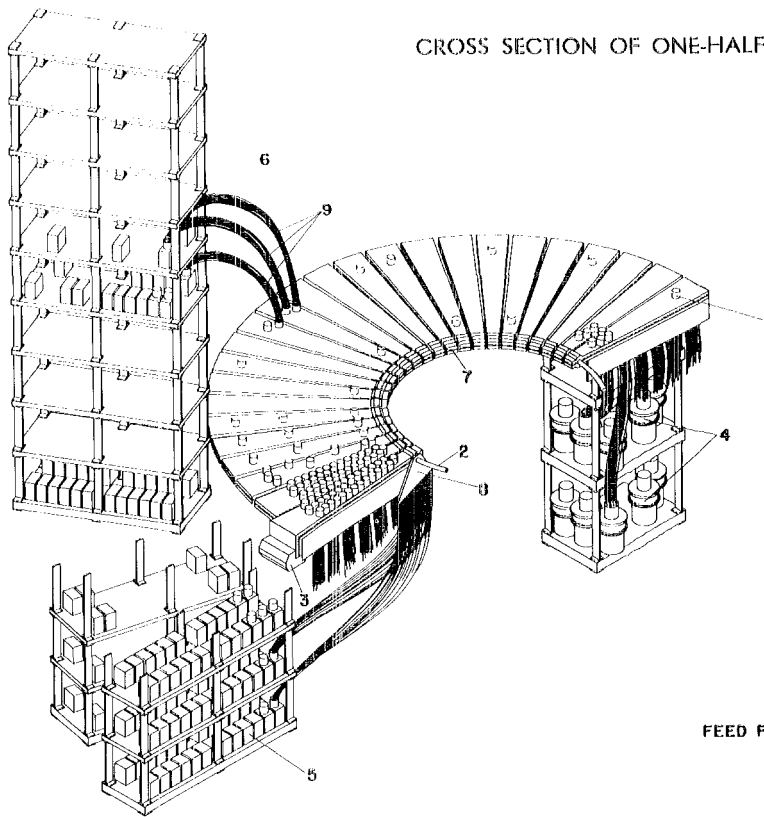
But, before power reactors can be researched and built, the problems of maintaining a dense plasma at high temperatures for long times must be solved through research with devices like the Shock Heated Toroidal Z-Pinch device and Scyllac.

These two machines are the result of studies that began long before a fusion program officially started at LASL. According to Tuck, "In 1945 at Los Alamos, some physicists—Fermi, Teller, Landshoff, Wilson, Kerst and I—and maybe others—used to meet together to discuss what seemed for those days, a ridiculously "far out" almost absurd idea—the possibility of producing a controlled thermonuclear reaction. There exists a paper that Ulam and I wrote searching for ways of producing some thermonuclear effect that could even be detected. One of the ideas was to collide high velocity jets of uranium deuteride. On returning from Bikini in 1946, I took up an experimental study of these jets. Some very fast (about 100 kilometers per second) jets were made and after I returned to England in August of 1946 the work was continued under Willig. Nothing very definite came out of it and after a year or so, the project was allowed to fold. This must have been the first experimental effort anywhere in the world to make a thermonuclear reaction.

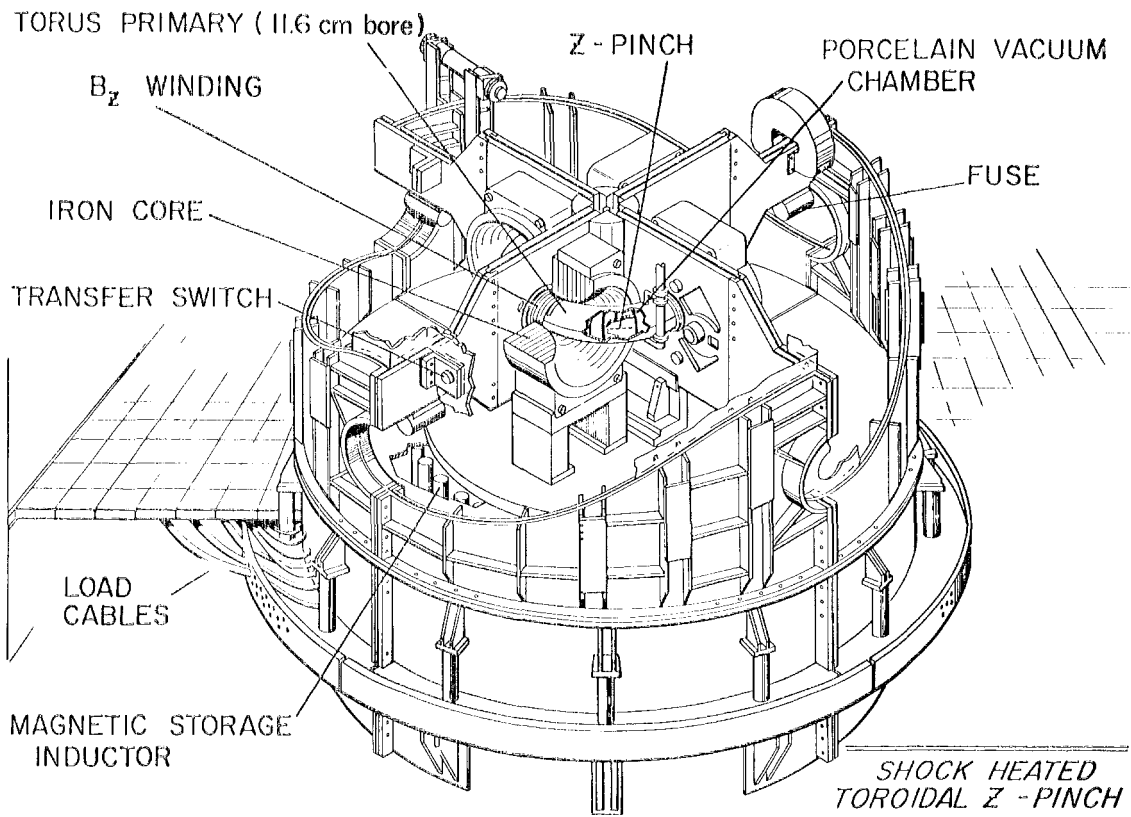
"Back in England at Oxford University, I made a proposal to the UKAEA for a pulsed toroidal B_z stabilized Z-pinch (in which a stabilized magnetic field is horizontal to the plasma column) for studying thermonuclear reactions. Such a geometry would be called today a toroidal screw pinch. Some funds were provided and some pulsed Z-pinch experiments began.

"Meanwhile contact was established with Teller who was eager to expand studies of thermonuclear weapons. Remembering life at Los Alamos with pleasure, I agreed to immigrate and return to Los Alamos provided that an intermediate year's "cooling" period could be spent at some university. This was arranged and I spent a year at the University of Chicago Institute for Nuclear Studies with Anderson, Fermi, and Marshall who were building the large cyclotron. There, Teng and I invented the regenerative reflector. When the year was over, August of 1950, I joined T-

CROSS SECTION OF ONE-HALF OF SCYLLAC



- CABLE CARTRIDGES-1
- DISCHARGE TUBE-2
- CROWBAR SWITCH-3
- PREIONIZATION BANK-4
- STABILIZATION BANK-5
- PRIMARY CAPACITOR BANK-6
- COMPRESSION COIL SECTOR-7
- FEED FOR STABILIZATION CONDUCTORS-8



division in Teller's group and was given the responsibility for redetermining the DD (deuterium-deuterium), DT (deuterium-tritium) and DHe³ (deuterium helium-3) cross sections. These are vital for weapon design as well as, of course, for thermonuclear fusion but were very inaccurately known because of the difficulty of measuring them at low energies. A special group, then designated P-7, was formed in P-division with Arnold, Phillips, Sawyer, Stovall and with me as group leader, still in T-division.

"By late 1951, the cross sections were measured successfully and turned out to be larger and more favorable than expected and therefore kept extremely secret for a year or two because of the boost they gave to thermonuclear weapon feasibility. It may be recollected that this was a time of tension. Teller left to found the Livermore Laboratory and I elected to stay. Their work completed, Group P-7 was reluctant to disband and a proposal was made to the director of the Laboratory, Norris Bradbury, that some modest experiments be started on controlled thermonuclear fusion. This he agreed to do and on Feb. 14, 1952, the group was formally instructed by Darol Froman, director of research, to start CTR and to build a toroidal Z-pinch machine which was named "Perhapsatron." The group consisted of Phillips, Sawyer, Stovall and Tuck and was soon joined by Burkhardt and Swickard.

"At this time, no other controlled thermonuclear research in the U.S.A. was in operation though secretly and unknown to the U.S., a strong program was already underway in the USSR and another fairly large one was building up in the U.K. Reports of thermonuclear matters abroad appeared sometimes in the press and one of these destined to have considerable consequences appeared in the March 25, 1951, "New York Times," entitled "New Way to Make Atom Yield Power" with the subtitle "Reports Argentina has Devised Thermonuclear Reaction that Does Not Use Uranium." Peron, the dictator of Argentina, had set up a somewhat overoptimistic Austrian emigre physicist named Richter in a fancy laboratory perched on an island in a lake in Western Argentina named Bariloche. It turned out that Peron, dazzled by the promise of thermonuclear power was relying on this to prop up the Argentine economy and save it from the consequences of the disastrous economic policy he was pursuing. This is history repeating itself—the old story of the alchemist who lures the dictator

with dreams of turning dust into gold. Unfortunately for Peron, the alchemist did not come through in time, yet somehow Richter escaped with his life.

"At this time (1951-52) the subject of CTR seemed to be in the air and in the U.S. other physicists were urging the start of thermonuclear projects. In Princeton, for example, astrophysicist Spitzer was proposing a thermonuclear device called the Stellarator, while Herb York at the newly formed Livermore Laboratory was proposing thermonuclear reactors using magnetic mirrors, and at the same time, Shipley and Luce at ORNL were proposing magnetic mirror machines with arcs (DCX).

"In 1953 Admiral Strauss became chairman of the AEC and caused a meeting to be held in Washington attended by Alvarez, Kerst, Spitzer and I to determine whether there was any possibility of truth in these thermonuclear stories. Being assured that such things were possible in principle, he was motivated by the possibilities of controlled fusion energy. On becoming chairman, CTR became an important project with considerable priority and high secrecy under the special care of T. H. Johnson in the Division of Research of the AEC. At that time (1953), the CTR group was making plans to move from Trinity Drive to the new Administration building to be built on South Mesa. For the location of the new quarters for P-7 and its controlled thermonuclear research, I professed indifference "only so long as it was within one minute's walk of T-division." The bottom three floors of the northwest leg of the new Administration building which met this condition were allocated to CTR.

"At the bidding of the chairman, proposals for enlarged facilities were requested. Normally such matters as buildings and money for them are very deliberate, taking several years but at the urging of Strauss plans were drawn up in jig time for the "barn" and the "pit" currently located to the northwest of the Administration building. The money required amounted to \$265,000—a tremendous bargain—and Strauss being a banker understood that subject. The AEC was instructed to look for some contract with an underrun and this was found in Project Lincoln at MIT. A cover name was needed for the chairman's intensely secret high priority fusion program. The transfer of funds from rich Lincoln to pay me somehow prompted the name Sherwood to be chosen by the AEC."



William Ogle Receives AEC Citation



William Ogle, J-division leader at the Los Alamos Scientific Laboratory, was presented the coveted Atomic Energy Commission Citation Feb. 24 by Commissioner Clarence Larson.

The citation, established Aug. 17, 1960, consists of a gold medal and a parchment scroll signed by the chairman and members of the Atomic Energy Commission and by the general manager or director of regulation. It may be presented to private individuals as well as to AEC employees who have made especially meritorious contributions to or have been outstanding in the United States nuclear program.

Ogle's citation reads:

"In recognition of his outstanding contributions to the defense of the United States through his leadership and participation in the nuclear weapons test program of the Los Alamos Scientific Laboratory since 1944 and as Test division leader since 1965; and for his technical skills which contributed immeasurably to the success of nuclear tests conducted in the Pacific and at the Nevada Test Site while serving as group leader, group director and scientific deputy commander of Joint Task Force Eight during the last U.S. atmospheric test series—Operation Dominic—in 1962."

continued on next page

Ogle was born in Los Angeles, Calif., Aug. 30, 1917. He received the B.A. degree in mathematics and physics in 1940 at the University of Nevada. He received the M.A. in physics in 1942 and the Ph.D. in physics in 1944, both at the University of Illinois. After earning the latter degree, Ogle was employed by LASL and has been with the Laboratory since.

From 1946 to 1951 he was Betatron group leader in LASL's Physics division. He was a group leader within the Test division from 1948 to 1951; assistant Test division leader in 1951; associate and alternate Test division leader from 1952 to 1965. He was then promoted to Test division leader.

The Test division has responsibility for executing the weapon development tests sponsored by the Laboratory, and for designing and carrying out the diagnostic measurements of these tests. It also carried the responsibility for testing LASL nuclear propulsion reactors until last year.

Ogle has participated in all Pacific nuclear tests and most Nevada Test Site operations. He was present when the first atomic bomb was detonated near Alamogordo, N.M., in 1945.

During overseas and continental test operations, he was Test group leader for Operations Plumb-

bob, Teapot, and Hardtack Phase II; commander of a task unit during Ivy; commander of a test group for Castle; Joint Task Force Seven's deputy commander for scientific matters for Redwing and Hardtack; co-chairman of the Plumbbob Advisory Panel; chairman of the Advisory Panel for Kiwi-A; and scientific advisor and scientific deputy to Joint Task Force Eight during Operation Dominic and subsequent tests.

The division leader has been the recipient of numerous awards. Among them are the Department of Defense Award in 1956 for contributions to Operation Redwing at the Eniwetok Proving Grounds; the U.S. Navy's Distinguished Service Medal for his "outstanding contributions to the Department of the Navy in the field of nuclear weapons technology;" the Department of Defense Distinguished Public Service Medal in 1966 for "exceptional meritorious civilian service while serving in the national nuclear weapons testing program from Nov., 1944, to Jan., 1966;" and the University of Nevada's Honorary Doctor of Science in 1963.

Ogle is a member of Lambda Chi Alpha, Phi Kappa Phi, Sigma Xi, and is a Fellow of the American Physical Society.



Bernd Matthias is Named Fellow of LASL

Bernd Matthias, internationally known solid-state physicist, is the first person to be named a Fellow of the Laboratory.

The new staff category was recently created by LASL Director Harold Agnew. Eventually, five to seven other outstanding scientists are expected to serve the Laboratory in this capacity.

Matthias, a Laboratory consultant since 1957, will spend approximately one-third of his time at LASL pursuing a variety of research interests in solid-state physics and superconductivity, fields in which he has made significant contributions.

Matthias is a professor of physics at the University of California, San Diego, and a part-time member of the technical staff of Bell Telephone Laboratories, Inc. He is also acting director of the In-



stitute for Pure and Applied Physical Sciences at UCSD.

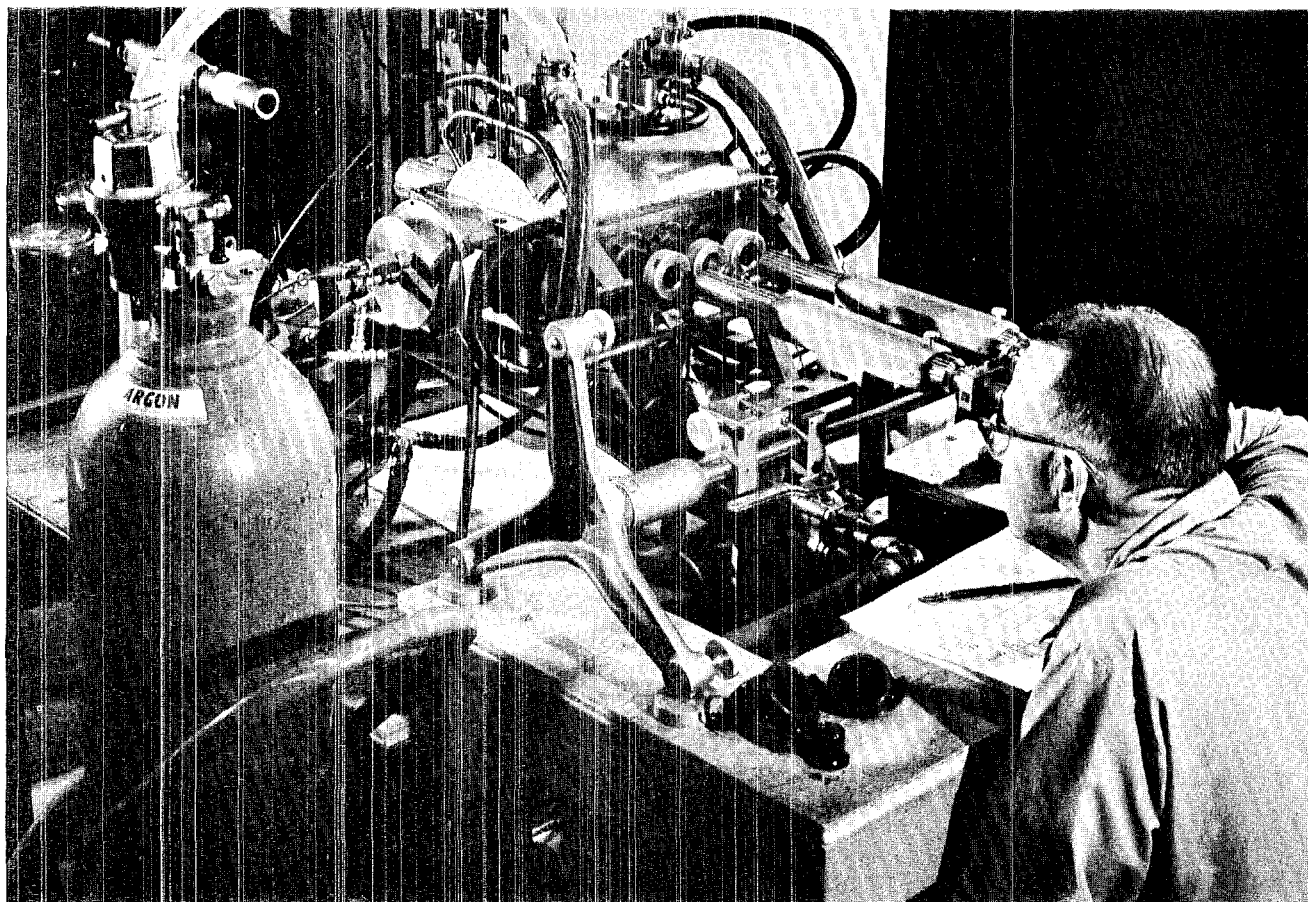
The 52-year-old physicist was born in Frankfurt, Germany, and received the Ph.D. in 1943 from the Swiss Federal Institute of Technology in Zurich. He was a member of the Institute's staff until 1947 when he joined the staff at the Massachusetts Institute of Technology. In 1948 he joined the Bell Telephone Laboratories. He was also an assistant professor at the University of Chicago from 1949 until 1951.

In addition to being a Fellow at LASL, Matthias holds Fellowships in the American Physical Society and the American Association for the Advancement of Science. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the Swiss Physical Society.

He has received numerous awards and honors including the Research Corporation Award in 1962; John Price Wetherill Medal in 1963; Industrial Research Man of the Year in 1968; and the Oliver E. Buckley Solid State Physics Prize in 1970.



Young's Modulus Furnace



Charles Saunders, N-7, looks through the twin microscopes to visually measure how much a material has expanded in going from one temperature to another.

*P*ut a bottle of pop in your freezer and the pop will expand to the limits of its container and eventually fracture it. This act will probably never become commonplace, but it does exemplify a point about nuclear reactor fuel elements.

With regard to fuel elements, however, the temperatures of interest are at the other end of the scale. An important consideration governing the choice of fuel materials for nuclear reactors is the ability of the material to withstand stress, strain, expansion, twisting and other physical deformations at high temperatures without fracturing.

It would be extremely costly and time consuming to test the physical properties of potential materials

and composites in a nuclear reactor. Therefore, to aid scientists in choosing the best materials for fuel elements, a variety of types of equipment has been devised to partially simulate the conditions an element will be subjected to in the core of a high-temperature reactor. The use of these devices enables scientists to predict the capabilities of materials to stand up under reactor operating conditions.

One apparatus for testing fuel element materials that has caught the eye of scientists internationally is the N-division Young's Modulus Furnace. It was named for the English physicist and physician, Thomas Young, who developed a method

continued on next page

for testing the stiffness or rigidity of a material. This material property is called Young's Modulus.

Young's Modulus and expansion characteristics of materials are measured routinely with the use of the N-division furnace. The modulus is measured by heating a material in the furnace to a desired temperature and then passing an ultrasonic sound wave through it. The sound wave causes the material to vibrate. By measuring these vibrations, the Young's Modulus of a material can be calculated. At the same time, how much a material has expanded in going from one temperature to another is measured with the use of twin microscopes which allow the observer to look at the sample while it is being heated inside the furnace.

This process takes about a workday for each material tested and is called a "run" by Charles Saunders of N-7 who is the principal operator of the furnace. Saunders has made approximately 400 runs on the furnace since it was installed about two years ago.

The furnace is a replica of one built by Harry Brown and Philip Armstrong, both of CMB-13. Armstrong, Saunders and Paul McEwen of SD-2 built the Young's Modulus Furnace for N-division.

The capabilities of the furnace to reach extremely high temperatures and the technique used to pass an ultrasonic sound wave in and out of the furnace at these temperatures are two distinctly unique characteristics of the apparatus when compared to others used to do similar work.

"The furnace is capable of reaching 4,900 degrees Fahrenheit, but this is the temperature at which most fuel elements are cured, so we stop at 4,500," said Saunders. "Most furnaces used in materials testing don't get above 3,000 degrees."

The ultrasonic sound wave is passed in and out of the furnace by two electronic devices. One, called the "driver," introduces the sound wave to the sample, causing it to vibrate. The other device, the "pick-

up," is a modified phonograph receiver which picks up the vibrations and transforms them into an electronic signal for recording instrumentation.

Faced with the problem that the driver and pickup could not withstand the extreme temperatures within the furnace, the developers positioned them externally. Contact with the material being tested is made by tungsten wires which are connected to the driver and pickup. These wires are inserted through the sides of the furnace. A micrometer drive on the pickup and driver enables contact with the sample to be adjusted for optimum signal transfer to and from the sample.

The frequency of the signal transmitted by the driver is adjusted so the sample vibrates at resonance. Resonance is the phenomenon whereby at certain electrical frequencies, a material will vibrate more than at others. All materials have one or more of these resonance frequencies. The resonance frequency of a material is attained by sweeping the frequency spectrum until a circle or an oval appears on an oscilloscope screen on the furnace assembly's control panel.

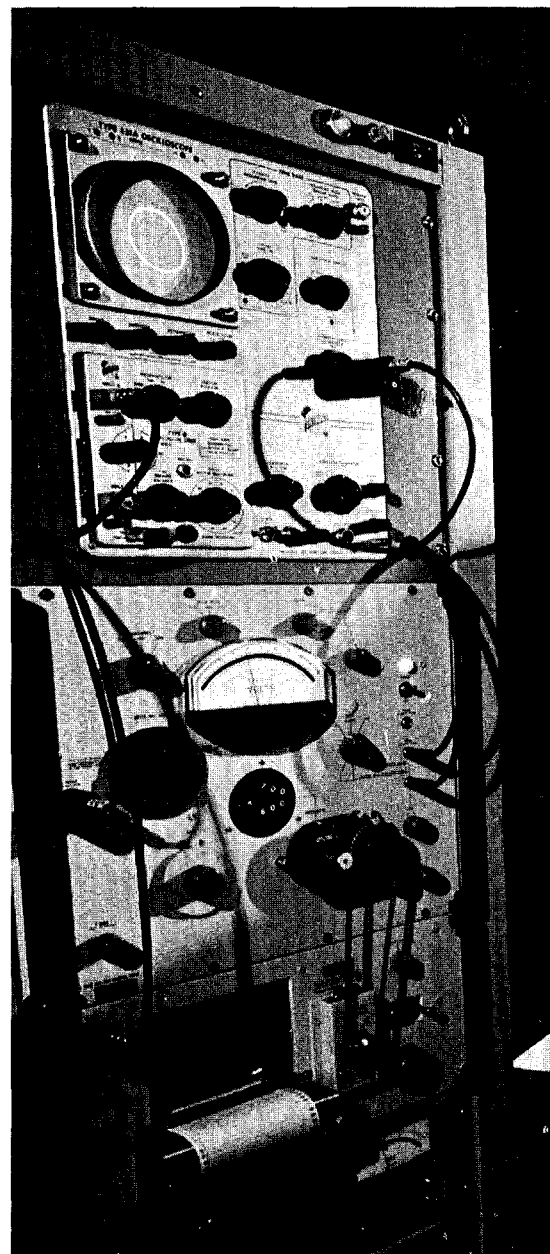
Materials that have been investigated to date include mostly graphites and metal-carbide graphitic composites for the Rover Program—America's endeavor to develop a nuclear-propelled rocket capable of interplanetary travel. Normally they have been shaped into circular rods—roughly the size of a king-size cigarette—although some tubes and irregular shaped materials have also been tested.

The circular rod samples are prepared by CMB-6 and machined by SD-1. A small hole is machined in each end to receive the driver and pickup wires. In addition, a fine groove is cut in each end which serves as an optical reference for measurement of the expansion of a material.

The sample is placed in a cradle inside the furnace. Air and moisture

are evacuated from the furnace and it is filled with the inert gas argon. Then, it is turned on.

When the desired temperature is attained and stabilized, the driver and pickup wires are coupled into the holes in the ends of the sample. Using the micrometer drive, the wires are adjusted so there is maximum signal transfer into and out of the sample. Next, the spectrum is scanned for the proper resonance frequency, and the overall length of the specimen is measured with

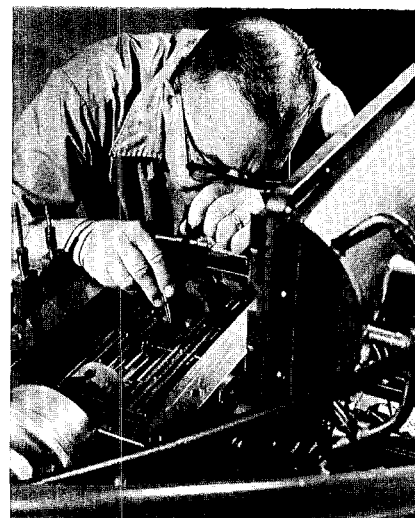


the twin microscopes, using the grooves in the ends of the sample as a reference.

This completes the test procedure at one stabilized temperature. This procedure is then repeated at various temperature increments up to 4,500 degrees to complete a run.

The Young's Modulus furnace has several advantages over materials testing equipment used previous to its inception. The temperature at which materials can be tested is 2,000 degrees higher, and they are

tested nondestructively and strain free (testing without physically deforming the sample). Previous equipment required high strain levels which resulted in the destruction of a sample with each temperature change and the measurements were averaged. With the newer apparatus, the thermal expansion of materials can be measured to about one per cent accuracy and Young's Modulus to within two per cent, according to Bureau of Standards comparisons. ❀



Above, Saunders points out a material sample he has placed in the cradle of the furnace.

Saunders adjusts the frequency of the signal transmitted to the driver to find the resonance frequency of a material. The resonance frequency of a material is attained when a circle or an oval appears on the oscilloscope screen, upper left.

350 LASL Employees Receive Service Pins

A total of 350 employees recently received pins honoring them for years of service at the Los Alamos Scientific Laboratory. Of these were 41 persons who have served the Laboratory for 25 years. Another 116 pins were given for 20 years of service, 68 for 15 years, and 125 for 10 years. These awards were presented during ceremonies in January and February.

25 Years

Allen, George W., GMX-3
Beauchamp, Richard K., P-9
Blackledge, Homer O., SD-5
Bottom, Charles W., GMX-3
Boyer, Dorothy C., PER-1
Bradbury, Norris E., Dir. Off.
(terminated)
Brooks, Melvin L., GMX-DO
Brown, Laurence J., P-1
Buckland, Carl W., Jr., H-1
Burditt, Franklin D., SD-5
Carlson, Bengt G., T-1
Carr, Leo J., H-4
Dabney, Winston L., AO-5
Duhamel, Harry F., SD-5
Dunahugh, Beatrice L., PER-6
Goldfarb, Irving, SD-5
Greenwood, James E., SD-1
Hall, David B., A-DO
Hansen, George E., SD-1
Hemmendinger, Arthur, W-8
Huber, Elmer J., Jr., CNC-2
Johnstone, Stanley G., SD-5
Krohn, Roy, CMB-3
McFerrin, John D., SD-4
Martinez, Filiberto E., SP-8
Metz, Charles F., CMB-1
Mirabal, Mary S., GMX-7
Peterson, George W., SD-4
Pohlmann, Bernard H., SD-2

Reum, Clyde E., SP-3
Rosen, Louis, MP-DO
Russ, Harlow W., W-3
Sandoval, Ruben J., GMX-2
Starner, John W., P-2
Tenney, Gerold H., A-DO
Treiman, Leonard H., CMB-2
Trousedale, Eugene W., SD-5
Van Vleet, Richard K., SD-5
Vonderheide, Elmer J., SD-5
Westcott, Roger J., N-DO
Yaeger, Joseph D., SD-1

20 Years

Archuletta, Felix B., GMX-3
Arnold, George P., P-2
Beaty, Ruth B., Dir. Off.
Berguland, Robert J., SD-2
Berry, Francis G., ISD-7
Bjorklund, Carl W., CMB-11
Boyer, Keith, J-DO
Bunker, Merle E., P-2
Campbell, Ethel, SP-DO
Carlson, Loren A., GMX-7
Chiles, William C., GMX-8
Clayton, James S., SD-4
Cole, Margaret L., ENG-DO
Cunningham, Joseph D., SD-5
Cunnington, Eugene W., ENG-2
Deal, William E., Jr., GMX-DO
Delgado, Manuel C., GMX-6
Devaney, Joseph J., T-DOT
Devine, John P., AO-DO
Dinegar, Robert H., GMX-7
DuFrane, Lawrence E., SD-4

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Elmore, Lawrence M., GMX-7
 Faudree, Robert E., GMX-4
 Ford, George P., CNC-11
 Gibson, Lloyd H., SD-5
 Gibson, Margaret E., P-9
 Gilligan, Byron W., CMB-6
 Goldstein, Irving, SD-1
 Goodier, Benjamin G., N-4
 Graves, Elizabeth R., P-6
 Grover, George M., N-5
 Hansen, Gorden E., N-2
 Harper, Paul E., C-DO
 Hayes, F. Newton, H-4
 Headdy, Winfred L., ISD-7
 Herrera, Theodore, CMB-6
 Heyman, Henry, Dir. Off.
 Hidy, Harold A., ENG-3
 Hiebert, Richard D., P-1
 Hoverson, Bruce E., W-1
 Humbyrd, Alvin E., GMX-3
 Jaynes, George E., Jr., CMB-6
 Kavanaugh, Henry J., CMB-1
 Keddy, Albert F., SD-5
 Kelley, Doris E., CMB-AP
 Kelly, Bernice S., T-DO
 Kerr, Eugene C., P-8
 Kleczka, Peter F., SD-4
 Knobloch, Gordon W., CNC-11
 Lamkin, Eugene, ISD-7
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 Little, Edward M., P-15
 Livingston, Robert W., SD-5
 Lopez, Albert G., GMX-6
 Lovato, Alex, CMB-6
 McCall, William M., ENG-1
 McClelland, Jean, H-5
 McInteer, Berthus B., CNC-4
 McQueen, John H., J-DOT
 McQueen, Robert G., GMX-6
 Malik, John S., J-DOT
 Manley, John H., Dir. Off.
 Mann, Joseph B., Jr., CNC-4
 Martinez, Aniseto, SP-3
 Martinez, Delfino, GMX-3
 Milford, Homer C., H-1
 Mills, Robert L., P-8
 Mingo, Russell H., ENG-4
 Montano, John L., SP-3
 Montoya, Frank M., CMB-6
 Montoya, Robert M., GMX-3
 Moore, Benjamin L., W-DO
 Moore, Philip F., CNC-11
 Mulford, Robert N. R., CMB-5

Murphy, Marvin A., CMB-6
 Naranjo, Albert, SD-1
 Nash, Douglas E., SD-1
 Peek, H. Milton, J-10
 Pena, Bennie, N-2
 PerLee, Robert E., ISD-7
 Phillips, James A., P-14
 Price, George S., GMX-7
 Quackenbush, Arthur D., SD-5
 Richardson, James H., T-DOT
 Roach, Eugene H., SD-4
 Roberts, Samuel L., SD-1
 Romero, Acorcinio O., GMX-3
 Rutherford, T. Perry, N-3
 Rutledge, Earl R., J-1
 Rynd, Betty V., J-DO
 Rynd, Edgar B., W-1
 Salazar, Nicholas L., P-14
 Salmi, Ernest W., N-5
 Sanders, Phyllis C., H-4
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 Schulte, Stephen B., CMB-6
 Scott, William A., SD-5
 Shadel, Franklin D., SD-1
 Shaw, Everett E., Jr., J-7
 Silver, Donald F., SD-5
 Stein, Paul R., C-DO
 Stein, William E., P-DOR
 Stewart, Leona, P-DOR
 Stivers, Eugene L., P-1
 Sullivan, William H., SD-4
 Thamer, Burton J., Dir. Off.
 Thomas, Thelma A., N-2
 Van Etten, Edward J., GMX-3
 Venable, Douglas, GMX-11
 Vigil, Pedro S., GMX-3
 Vigil, Robert, CMB-6
 Waterbury, Glenn R., CMB-1
 White, George N., Jr., TD-5
 Williamson, Grace L., SP-12
 Wood, William W., GMX-10
 Worthington, Kermit, SD-1

Aguilar, Martin, ISD-5
 Albertson, Robert D., PER-1
 Apel, Charles T., CMB-1
 Baca, Dan, ISD-4
 Biggs, Alfred G., GMX-3
 Blevins, David J., N-3
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 Brundige, Edward L. CMB-6
 Caldwell, Charles W., GMX-6
 Campbell, Patrick, Jr., GMX-3
 Christenson, Conard, H-7
 Clark, Ruth L., SP-12
 David, Walter R., CMB-3
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 Elliott, Donald E., ENG-2
 Engelke, Morris J., H-1
 Foglesong, Mildred K., N-DO
 Geer, William U., N-2
 Green, Clara L., GMX-7
 Greenwood, Ralph H., P-4
 Guevara, Francisco A., CNC-4
 Hagerman, Donald C., MP-2
 Hillhouse, Nancy, SP-DO
 Johnson, Carl, Jr., J-1
 Johnson, George L., H-7
 Johnson, William G., ISD-3
 Jones, Daniel W. B., GMX-3
 Koelle, Alfred R., P-1
 Kohr, Kenneth C., J-12
 LaBauve, Raphael J., T-1
 Lewis, H. Maxine, CMB-3
 Lockett, Andrew M., T-9
 Loughran, E. Dan, GMX-2
 Lundgren, John L., CMB-11
 McCalister, Mary G., GMX-3
 McDonough, Leo W., N-2
 Marlett, Mary L., MP-DO
 Martinez, Cornelio G., H-7
 Martinez, Presciliano, ISD-5
 Masanz, Paul J., GMX-3
 Mench, Vera L., GMX-3
 Montoya, Carmen R., J-6
 Nagle, Darragh E., MP-DO
 Newman, Herbert J., N-3
 Ortiz, Cayetano R., H-1
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 Thieme, Melvin T., TD-4
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 Allen, Larry D., CNC-4
 Anderson, Charles A., GMX-3
 Archuleta, Florencio, H-1
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 Averitt, Harlan M., WSD
 Barela, Adolfo E., SD-2
 Barnes, Jo Ann, Dir. Off.
 Barnes, John L., SP-10
 Barnes, Robert L., SD-5
 Beery, Jerome G., P-DOR
 Billings, Ruth E., SP-11
 Bird, Paul F., GMX-7
 Black, Thomas D., SD-1
 Blackburn, Rolland J., CMB-7
 Blackstock, Albert W., N-5
 Blanks, Bruce L., GMX-1
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 DeLay, George S., SD-1
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 Fritz, Joseph N., GMX-6
 Fuller, Richard C., GMX-11
 Gould, Walter R., P-4
 Gritsko, Edward, SD-DO
 Hagan, Roland C., GMX-1
 Hamilton, Charles W., TD-5
 Hansen, Wilfred G., N-4
 Hargenrater, Thomas V., GMX-3
 Harper, James D., GMX-6
 Harvey, Bradford G., GMX-3
 Hasty, Jeanne E., CNC-11
 Helmick, Sara B., CNC-11
 Henderson, Michael G., TD-3
 Hicks, Mildred V., ISD-2
 Humphreys, Kenneth G., GMX-8
 Hyer, Ronald C., J-10
 Jasinaki, Opal D., GMX-4
 Johnson, Donald R., SD-5
 Johnson, Yvonne V., N-5
 Karr, Mae F., P-DO
 Keddy, Edward S., N-5
 Kenner, Ernest, SD-1
 Kerr, Mary Jo, AO-1
 Kerrish, Jeremiah F., CMB-11
 Kieren, George F., SD-5
 Kirby, Robert S., CMB-6
 Klebesadel, Ray W., P-4
 Kostacopoulos, John, CMB-6
 Lobb, Dorine G., SP-3
 London, Roger K., GMX-11
 Louck, James D., T-9
 Lyon, Luther L., N-1
 McDonald, James A., J-6
 McDowell, Robin S., CNC-4
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 Manker, Lawrence F., Jr., CMB-6
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 Munno, Edward J., SD-1

Mynaugh, Charles F., MP-3
 Nakayama, Paul I., T-3
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 Pasieka, Donald F., SD-5
 Poe, Bobby F., MP-3
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 Reid, James H., SP-3
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 Rivera, Oliver M., MP-3
 Robinson, George W., N-2
 Roybal, Dolores R., GMX-4
 Sanchez, Herman E., GMX-3
 Sandford, Thomas A., GMX-3
 Sandoval, John, ISD-7
 Schneider, Edward J., MP-3
 Schott, Patricia A., ISD-DO
 Serna, Orlando, CMB-AP
 Simmons, J. Edward, CMB-11
 Staake, Marjorie L., W-9
 Taylor, Roger W., GMX-11
 Terry, Donald R., ENG-4
 Thayer, Douglas R., J-14
 Trujillo, Gilbert E., SP-4
 Ulery, Lloyd H., W-1
 Ulibarri, Maria F., PER-1
 Valencia, Flavio A., CMB-3
 Valerio, Jose F. P., SP-3
 Van Vleet, Myra M., SP-11
 Vigil, Ernesto A., H-4
 Warner, Charles L., P-2
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 Warren, Virgil L., W-7
 Whitmore, Elmo J., Jr., J-7
 Witte, Kathleen F., C-7
 Witte, Maxwell G., GMX-3
 Worlton, D. Reid, TD-4
 Yusnukis, Donald J., SD-2

Doing Business with a 'Hot' Laundry

The Los Alamos Scientific Laboratory 000-a-year business with a "hot" laundry. The word "hot," in this case, refers to appropriately describes the type of state Laundry and Decontamination

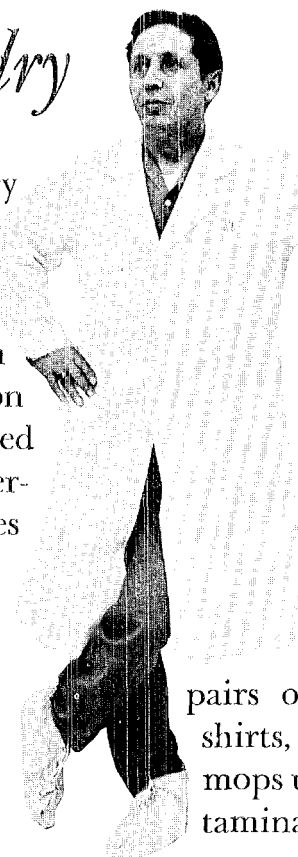
Interstate launders more than a million pounds, of the Laboratory's contaminated equipment each year. According to averaged by SP-10, more than 5,500 pieces Fe operation's doors every day.

The records show that about 3,000 of garments are canvas shoe covers, more common than those who wear them. There are 700 each of laboratory coats, shorts and and 120 miscellaneous items including areas, and canvas bags in which the contaminated to the laundry.

"This type of protective clothing is not specially made for the Laboratory," said H-1 Group Leader Dean Meyer. "It's off-the-shelf merchandise. We don't use it as a substitute for proper facilities and handling procedures for radioactive materials. The Laboratory issues protective clothing so that employees don't use their own and to protect the community in that the clothing is left in the work area. It's a convenient way of assuring that radioactive contaminants are not introduced to home washing machines.

"Not all of the clothing taken to Interstate is contaminated, but it has been used in work areas where radioactive materials are handled. Grossly contaminated clothing is buried at a disposal site for radioactive wastes. That which we send to Santa Fe has only low-level contamination."

Group H-1 determines what protective clothing will be worn at the various sites where radioactive materials are handled. The clothing prescribed varies according to an employee's work assignment and the type of work done in his area. Members of H-1 are also instrumental in preparing contaminated protective clothing for shipment to Interstate. The group's health physics surveyors collect the garments in canvas bags and monitor the bags for exterior contamination to insure the safety of personnel handling them. The surveyors then tag the bags to indicate the type of radioactive material used in the area from which the garments came.



does a \$165,-dry in Santa Fe. radioactive materials and laundry in which Interstate Service, Inc., specializes. pieces, or a half-million protective clothing and age-daily-use records compass through the Santa

these protective garments only called "booties" pairs of socks, 450 towels, 300 shirts, 240 coveralls, 150 caps, mops used to clean contaminated taminated articles are trans-

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Each day the bags of contaminated clothing are collected by SP-4, trucked to Santa Fe, and exchanged for protective clothing laundered the previous day. SP-4 delivers the laundered garments to SP-3, the Laboratory's stocking agent. Members of SP-3 spot-check the garments to assure that laundering has reduced radiation levels to within prescribed levels. They also break it down and prepare it for delivery to the sites by SP-4. After being delivered to the sites, the garments are periodically spot-checked again, this time by H-1's health physics surveyors, to assure that the clothing is safe for use.

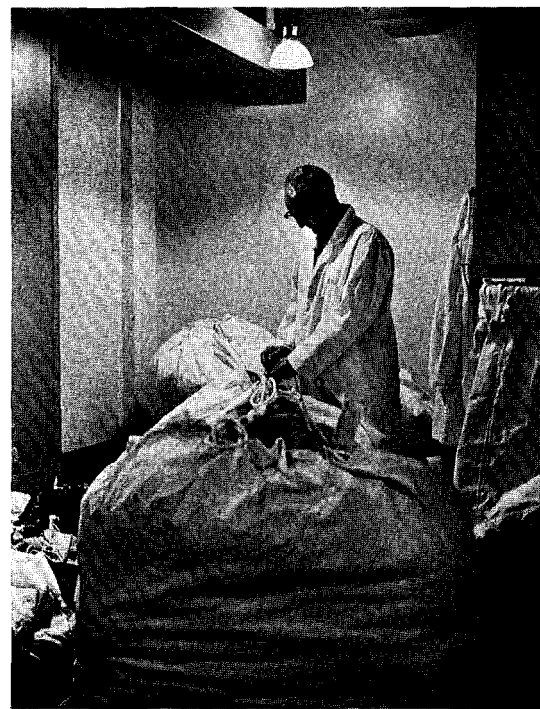
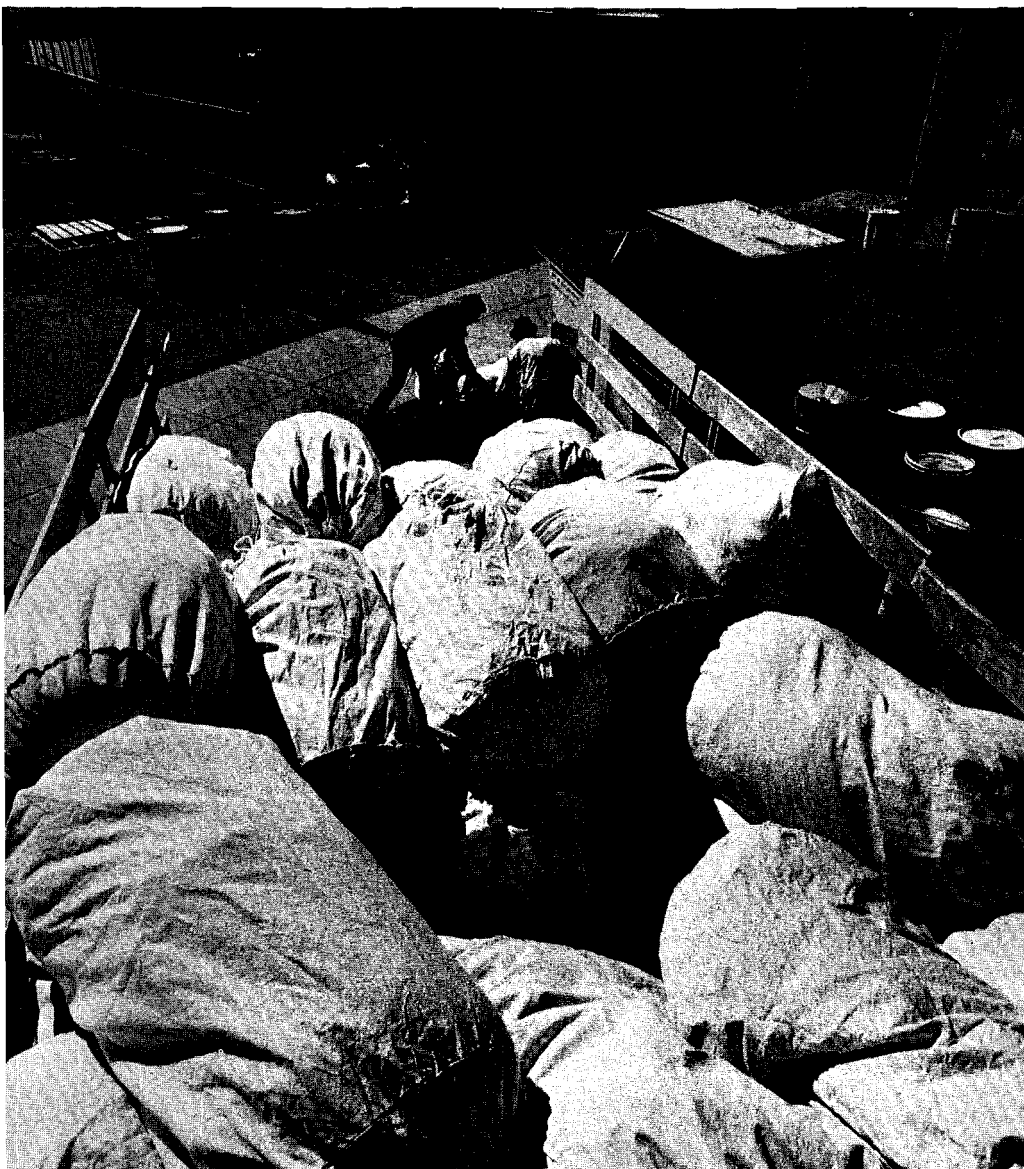
There is nothing mystical about washing nuclear contaminants out of protective clothing. The processes used are similar to those used in most conventional commercial laundries. A high grade of laundry soap is blended according to the contaminant with which a garment is impregnated. In LASL's case, the contaminant is usually plutonium.

What is unique about laundries such as Interstate are the control measures required of them to protect the public and their own personnel from exposure to harmful levels of radioactivity.

They are licensed by the Atomic Energy Commission to do business

with AEC installations such as LASL. The AEC prescribes certain regulatory measures which are supplemented in New Mexico by the State Health and Social Services Department's Environmental Services Division. These two regulatory groups conduct periodic inspections of Interstate's records and facilities. In addition, the laundry must decontaminate protective clothing to below radiation levels prescribed by its customers, such as LASL.

Interstate, which has several plants similar to the Santa Fe operation throughout the country, has two radiological safety officers—one on the East coast and one on the



Above, Homer Milford, H-1 health physics surveyor, tags a bag of laundry at the CMR building to indicate the type of radioactive material used in the work area where the clothing originated. At left is equipment used by Milford to monitor the bags for external contamination.

Morris Santistevan and Jose Bustos, SP-4, pick up laundry at the LASL Shop department.

West coast—who determine policy and operational guidelines for the Interstate plants. In addition, there is a local health physicist for each operation, to enforce policy and operational procedures set down by the radiological safety officers. To avoid any possibility of a conflict of interests, these officials are not dependent upon Interstate or any of its accounts for a livelihood. Rather, they are persons qualified in their fields, selected from industry or college and university staffs on a consulting basis.

The protective control measures under which the Santa Fe plant operates begin when incoming laundry is unloaded in its receiving room. Here the plant's personnel break down the bags of laundry under an exhaust hood. The contaminating material, indicated by the tag put on each bag by H-1's health physics surveyors, is monitored and alpha and beta-gamma emitting articles are separated.

The exhaust hood's fans create a slight negative air pressure in the receiving room to keep contaminants from spreading into other areas of the plant when a door to the room is opened. Contaminants are properly filtered from the air drawn up through the hood before being vented to the outside. Plant personnel monitor the air daily and keep records on the emission of contaminants to the atmosphere.

From the receiving room, the clothing is taken into the work area where it is weighed into lots of either 200 or 400 pounds, depending on which of the automatic washing machines is to be used. Alpha and beta-gamma emitters are laundered separately, dried, folded, and monitored again before being packaged for pickup by SP-4.

Solid wastes are filtered from the water used in the laundering process each day. These are packaged according to AEC specifications and shipped to a disposal site for radioactive materials in Nevada.

The filtered water drains into a 15,000-gallon storage tank. Eight liter samples of this water are taken



each day and analyzed for contaminants. After the analysis has been made, the water is drained into three 8,000-gallon holding tanks where it is diluted so that it can be safely discharged into the Santa Fe sewer system.

Other control measures include the taking and analysis of smears inside the building and urinary samples from workers. Plant personnel are also required to wear film badges and to shower before leaving the building.

Eberline Instrument Corporation of Santa Fe reviews the daily records on atmospheric emissions, and analyzes the water samples, smears, film badges and urinary samples. Like the services of the radiological safety officers and the health physicist, these functions must be performed by a third party to avoid any possibility of a conflict of interests. Information from reviews and analyses are recorded by the corporation. These records are available to the AEC and the Environmental Services Division during their periodic inspections.

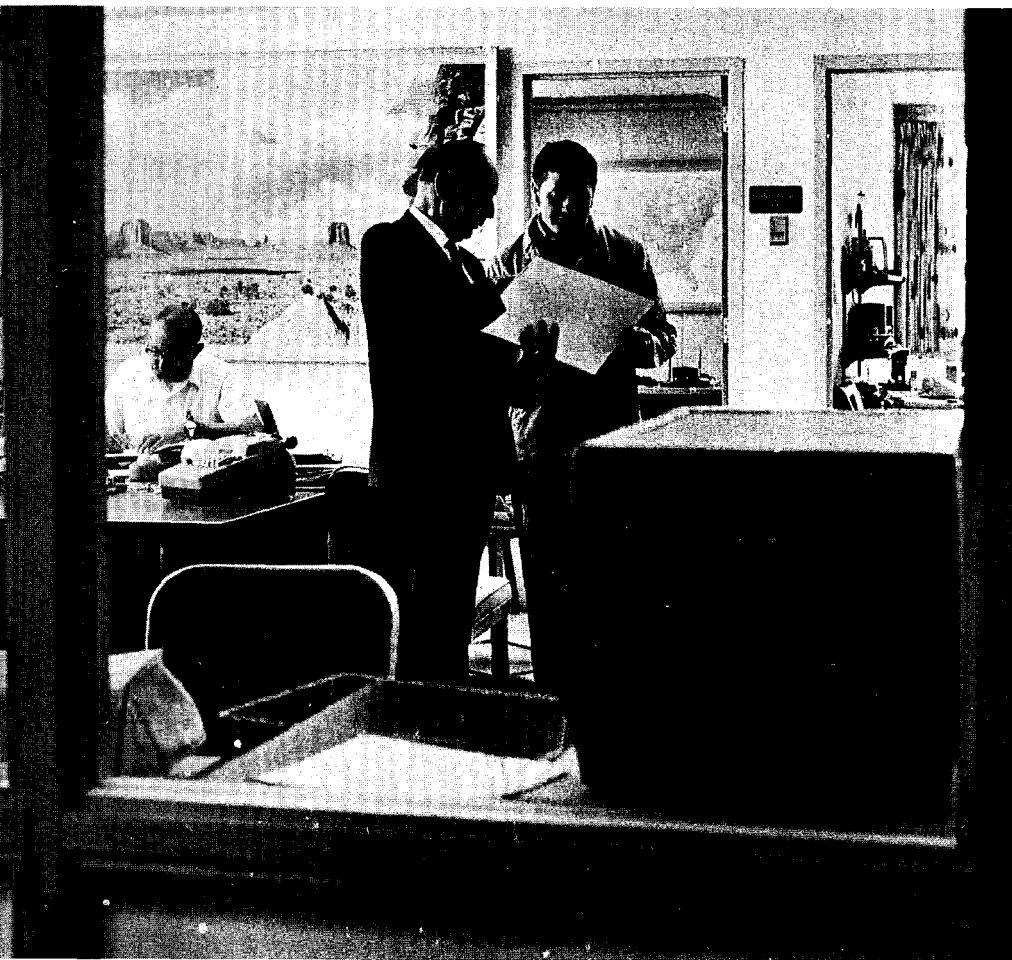
Time was that the Los Alamos Scientific Laboratory laundered its

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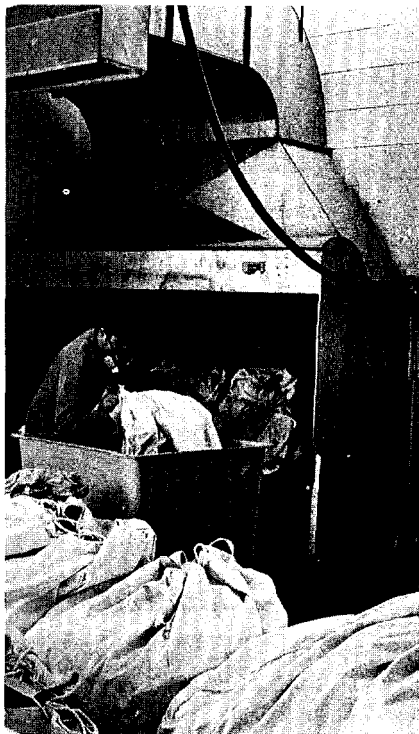
Milford spot-checks protective clothing in one of the CMR building's supply rooms. "What we're particularly suspicious of on laboratory coats are the sleeves," he said.



Separating laundry that has been returned to the Laboratory from Interstate are Lee Williams, left, Arsenio Salazar and Margaret Nelson, all of SP-3.



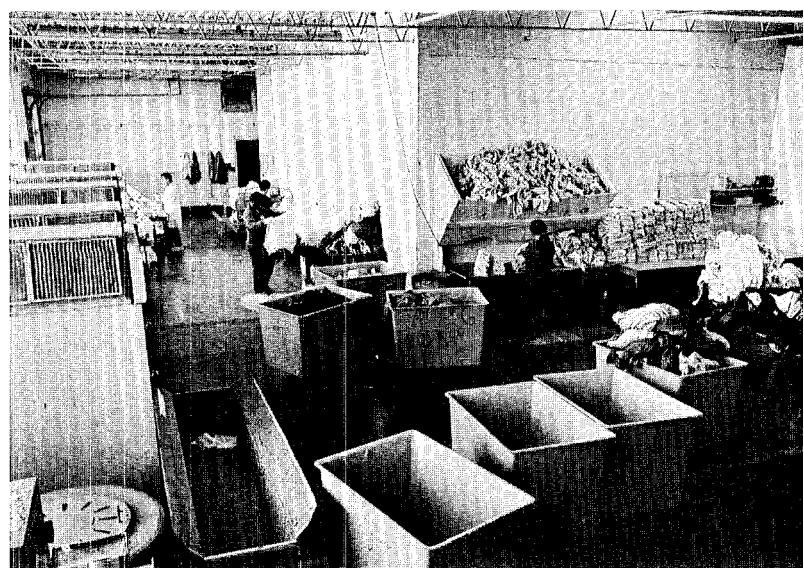
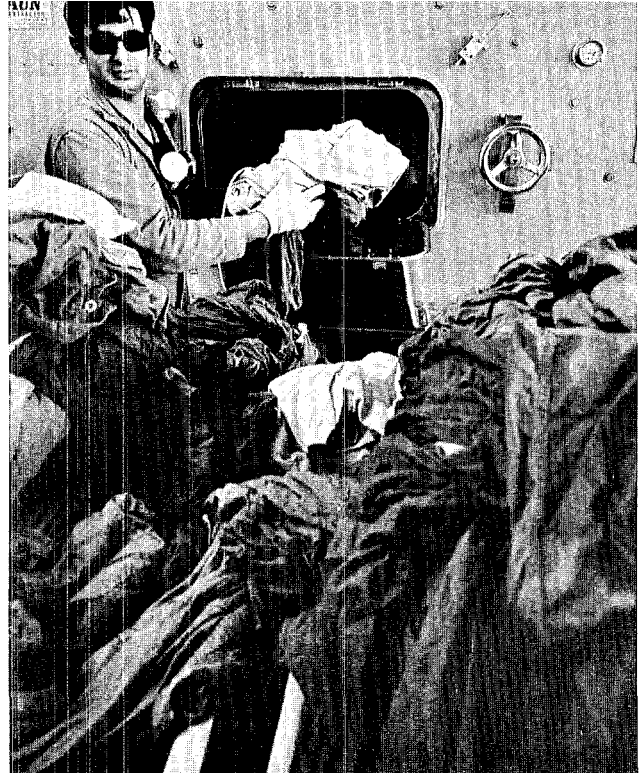
Above, Joe Butler, Interstate's national nuclear director, talks with Joe Romero, manager of the Santa Fe plant. At left is Tom Perry, office manager.



Left, Higinio Cardenas breaks down a bag of laundry from LASL under the exhaust hood in the Santa Fe plant's receiving room.



Right, Helen Calles folds "booties" that have been laundered.



Top, Cardenas retrieves laundry from Interstate's 400-pound washing machine. Above, Interstate employees prepare laundry for shipment back to LASL.

own contaminated protective clothing. But, in compliance with a Federal ruling that government installations should not compete with private industry, the Laboratory, in 1961, transferred this function to Interstate.

When the laundry operation was transferred out of the Laboratory, Health division and the Supply and Property department drew up the specifications Interstate Laundry and Decontamination Services, Inc., would have to meet. Health division prescribed the acceptable radiation levels in laundry returned to the Laboratory and Supply and Property negotiated the contract.

P. M. Petersen, SP-10 group leader, noted that when private industry was solicited for operation of the "hot" laundry, two bids were received. "One of the bids was from Pennsylvania," he said. "We would

have had to truck our laundry all the way to Pennsylvania, and this would have been expensive. The other bid was from the Interstate people. They made us the proposition that they would build a laundry facility in Santa Fe in exchange for a two-year order. We agreed to it and assisted them in every way we could."

Today, the Santa Fe operation is headquarters for Interstate's National Nuclear Division. The director of the division is Joe Butler.

"Interstate," Butler said, "originated in the Boston area under the name of Industrial Laundries 35 years ago. It became one of the largest industrial laundry operations in the East. Today it operates 18 industrial plants of which seven service nuclear accounts from the East coast to Honolulu.

"Prior to 1958 all decontamina-

tion work was done by government installations. In 1958 the government licensed three responsible companies to do this work, of which Interstate was one.

"When Interstate received its first license, I assumed responsibility of the original plant and took part in the establishment of the next six. We started operations in Springfield, Mass. Another plant was put into operation in Pittsburgh, Pa., and in 1961, I came here from Salem, Mass., and established this one. This is Interstate's third plant and employs about 15 people.

"We started this operation with LASL and eventually began servicing other nuclear accounts in the Rocky Mountain area. In the nine-year history of this plant, we've had a very pleasant association with LASL."



Changes Announced in Health Division

Health Division Leader George Voelz has appointed a radiological health advisor within the division office and combined two groups.

Jack Healy, H-1, has been assigned to the new position of radiological health advisor within the Health division office. His responsibility is to advise the division leader on matters of special radiological health problems, national regulations and standards, and technical evaluation of radiological problems pursuant to establishing LASL policies. He will be on the division office staff to provide consultation and advice to the division's groups on radiological health problems and to coordinate division assignments involving several groups or divisions, such as environmental statements.

Groups H-6 (Environmental Studies) and H-8 (Field Studies) have been combined and designated H-8 (Environmental and Field Programs). The reorganization will place responsibility for radiolog-

ical surveillance of LASL test activities and plant environs within one group.

Harry Jordan is H-8 group leader. Jerome Dummer is alternate group leader and William Kennedy is associate group leader.

The Field Support section of H-8 will provide health physics advice and support on test operations, including development of special field monitoring techniques and instrumentation, evaluation of special test problems, data analysis and reports.

It will also direct and coordinate the radiological support for LASL activities outside the confines of the Laboratory.

The group's Environmental section will provide radiological measurements of air, water, soil and other analyses as needed to evaluate the effect of plant operations on the environment, including data analysis, reports and recommendations. It will also provide necessary meteorological support for Laboratory functions.



Jack Healy



Harry Jordan

short subjects

Conrado Gutierrez has been appointed Equal Employment Officer for the Laboratory.

Gutierrez, an employee at LASL since 1946 works in a staff position reporting to the director on all matters concerning Equal Employment Opportunity including policy and program development, Laboratory compliance with EEO regulations, and the Affirmative Action Plan. He also participates in the recruitment of minority-group employment candidates, prepares EEO compliance reports, and represents the Laboratory in EEO functions.



Gutierrez received the B.S. Degree in chemistry at the University of New Mexico in 1941. He then worked as a chemist for Anaconda Copper Company in Cananea, Sonora, Mexico, prior to his service in the U.S. Army in World War II. He served as repatriation officer in Japan in 1945-46. After being discharged he joined the LASL staff and was a chemist in CMB-3 before being named Equal Employment Officer.



Complete indexes for the 1970 issues of "The Atom" are available at the Laboratory's Public Information office. There is no charge.



Frederick Worman, formerly of H-DO, died Feb. 17 in Bataan Memorial Hospital in Albuquerque. He is survived by his wife, Mary, and two sons Frederick of Honduras, Central America, and Walter of Cleveland, Ohio.

Worman was best known for his work as LASL's archeologist both in Los Alamos and at the Nevada Test site, and for his work in restoring historic ruins near the Los Alamos Community Center.

Three persons recently retired from the Laboratory. They are **Bernadette Rourke**, N-3, **Daniel Darnell**, SD-1, and **Lavern Turner**, SD-5.

Mrs. Rourke was first employed by LASL in 1952 and worked in Group GMX-7 until 1954. She was rehired in 1959 and employed by PER-4 until 1960 when she again became a member of GMX-7. She transferred to N-3 in 1962. Her husband, Edward, is employed by AO-5.

Darnell was first hired by the Laboratory in 1951 and worked for the Shop department until 1956. He was rehired in 1967 and worked for SD-1 until his recent retirement. He and his wife, Evelyn, will make their home in Albuquerque.

Turner has been a member of the Shop department since 1953. He was first employed by SD-1. He and his wife, Lorraine, will continue to live in Los Alamos.



Robert Brownlee, J-DO, has been elected a Fellow of the New Mexico Academy of Science. The Award was presented last month in Albuquerque at the Academy-sponsored symposium on "Peace-Time Uses of Atomic Energy."



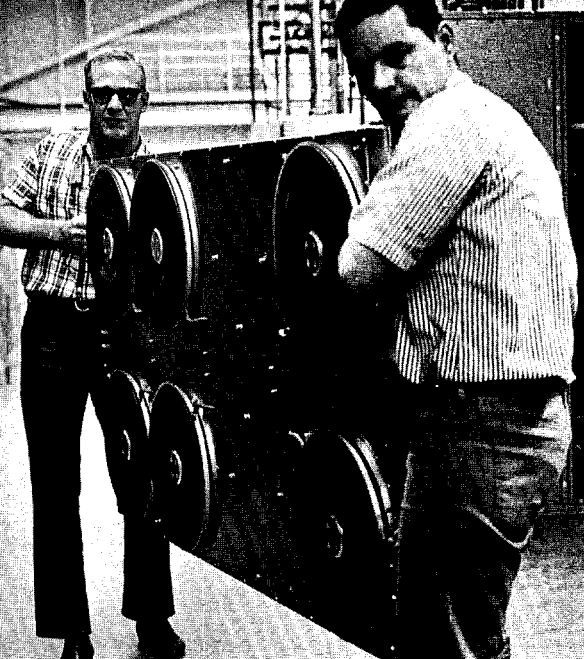
Stephen Stoddard, CMB-6 Ceramics Section leader, has been elected vice president of the 7,500-member American Ceramic Society. Stoddard will serve a one year term and will be installed at the Society's 73rd annual meeting in Chicago April 26.



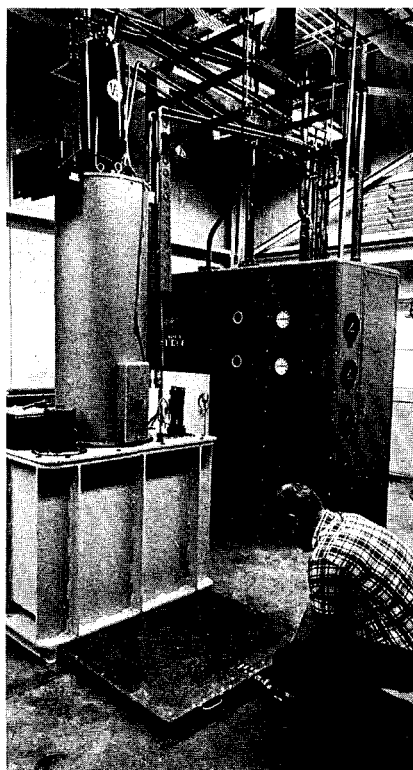
Roswell Mitchell, SD-1 machinist, died Jan. 12. He is survived by his wife, Louise, and four children: Dorothy, Betty, Charlotte and Roswell, Jr.

Glenn Koontz, T-DOT, died Feb. 6 at Bataan Memorial Hospital in Albuquerque. He is survived by his wife, Selma, and four children: Glenn Daniel, Kimberlee, Glenn David and Kenneth.

U. S. Army Major **J. O. Ackermann** (retired) died Jan. 23 in Omaha, Nebr. Ackermann was a member of the Corps of Engineers who served as group leader of Group X-3 at Project Y during 1944 and 1945. He is survived by his wife, Ruth.



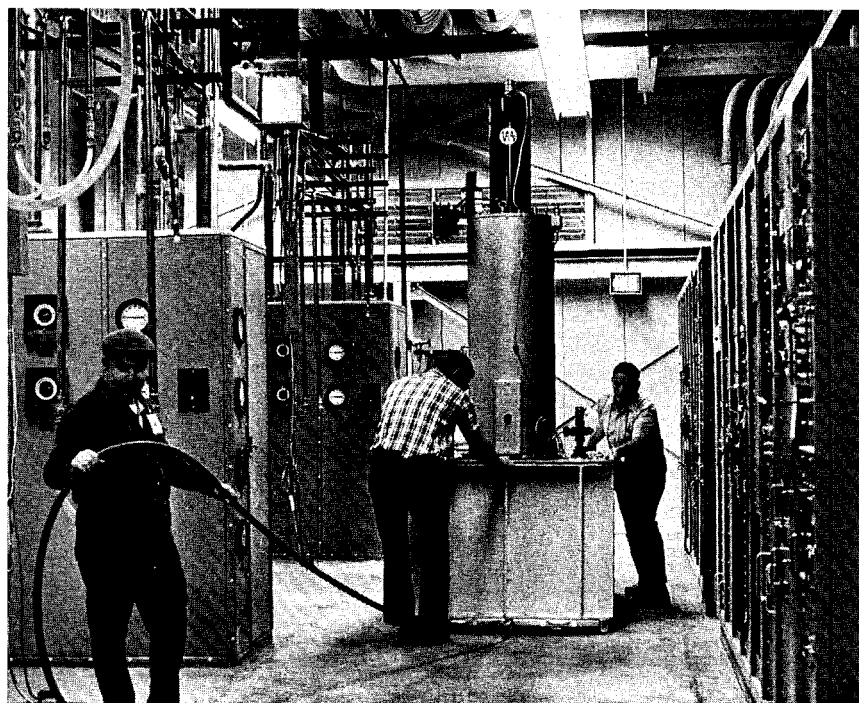
Moving and positioning the 7,000-pound klystron and modulator assemblies which will amplify power to the Los Alamos Meson Physics Facility accelerator is made easy by six-pad air pallets displayed by Bob Kandarian and Arlo Thomas, both of MP-2. Right, Kandarian connects the air hose to the pallet which has been placed under the assembly. Below, the assembly floats easily on the pallet and is guided into position by Kandarian and Thomas. A third man, in this case Robert Martinez, also of MP-2, is handy to have to operate the air valve and keep track of the hose.



Those who say they need transportation for a short run are offered a pair of tennis shoes by Bernie Weber, SP-2 motor pool dispatcher. At left is Edward Roybal, ISD-5.



A recent visitor to the Norris E. Bradbury Science Museum was Alfred Chamie, national commander of the American Legion. Chamie is shown here operating the mechanical hands on the Museum's hot cell exhibit. Other persons from left are Samuel Reading, N-7, commander of Post 90 in Los Alamos; Bob Brashear, museum manager; and Anthony Reymont of the Santa Fe Legion Post.





The "Silent Singers," a choir group of 14 students from the New Mexico School for the Deaf at Santa Fe were recent visitors to the Norris E. Bradbury Science Museum. At left, Thomas Szusztzky, choir director, translates for Bob Brashear, museum manager. Next to Brashear is Don Bradford, C-7, who is also deaf. He gave the students a history of the museum and helped with translations during the tour.

Officials from LASL and the United States Department of Agriculture held informal discussions regarding future applications of LASL research and instrumentation development to USDA interests, primarily in the areas of animal disease diagnosis and control. During a tour of the Health Research Laboratory Marvin VanDilla, H-4, left, explained some of the facilities available at HRL. Next to VanDilla is C. B. Peacock. Others are E. P. Pope (partially hidden), C. A. Manthei, R. S. Sharman, C. Hensley, and D. Zinter. Austin McGuire, Office of Special Projects at LASL, who arranged for the USDA visit is at right. (Photo by Ivan Worthington, ISD-7)



the technical side

Presentation at the 12th Annual Meeting of the American Physical Society, Washington, D.C., Nov. 4-7:

"Electrostatic Ion Cyclotron Current Instability" by D. W. Forslund, P-18, C. F. Kennel, University of California, Los Angeles, and J. M. Kindel, Princeton University, N.J.

"Interferometric Measurements of Plasma Densities in the LASL Toroidal Machine" by A. R. Sherwood, J. E. Hammel, I. Henins and J. Marshall, all P-17, and R. W. Peterson, P-15

"Plasma Diagnostics in the LASL Toroidal Quadrupole Injection Machine" by J. Marshall, J. E. Hammel, I. Henins and A. R. Sherwood, all P-17, D. A. Baker, P-18, R. W. Kewish, P-16, and L. W. Mann, T-5

"The Operation of a Toroidal Quadrupole with Kilovolt Plasma Energies" by J. E. Hammel and A. R. Sherwood, both P-17, and R. W. Kewish, P-16

"Computer Simulation of an Electron Cyclotron Instability Due to a Temperature Anisotropy" by S. J. Gitomer, University of Pennsylvania, Philadelphia, D. W. Forslund, P-18, and L. E. Rudisinski, C-4

Presentation at Knolls Atomic Power Laboratory, Schenectady, N.Y., Nov. 20:

"Multigroup Monte Carlo Development and Applications" by D. R. Harris, T-DOT, (invited)

Presentation at colloquium, Case Western Reserve University, Cleveland, Ohio, Dec. 3:

"Progress of LAMPF and Planning for the Nucleon-Nucleon Problem" by J. E. Simmons, P-DOR (invited)

Presentation at seminar at the Electrical Engineering Department, Michigan State University, East Lansing, Dec. 3:

"Automated Cell Identification and Sorting" by J. A. Steinkamp, H-4 (invited)

Presentation at special seminar, Sandia Corporation, Albuquerque, Dec. 4:

"Magee Rezone, A Program for Redefining the Mesh in the Two-Dimensional Time Dependent Lagrangian Hydrodynamic Code Magee" by R. L. Elliott, T-5 (invited)

Presentation at the Nuclear Engineering Department, University of New Mexico, Albuquerque, Dec. 4:

"Metallography and Qualitative Metallography of Experimental Reactor Fuels" by J. H. Bender, CMB-11 (invited)

Presentation at seminar, University of Colorado, Boulder, Dec. 4:

"Numerical Modeling of Fluid Flows and Their Applications" by C. W. Hirt, T-3 (invited)

Presentation at the National Fall Meeting of the American Geophysical Union, San Francisco, Calif., Dec. 7-10:

"Calculation of Continuum Spectrum and Visible Efficiency of a Lightning Return Stroke" by T. R. Connor, J-10

"Helium Enriched Interplanetary Medium and Solar Flares" by Joan Hirshberg, Stanford University, Palo Alto, Calif., S. J. Bame, P-4, and D. E. Robbins, NASA Manned Spacecraft Center, Houston, Texas

"Auroral Substorms and Associated Plasma Sheet Variations" by S. I. Akasofu, Geophysical Institute, University of Alaska, College, E. W. Hones, Jr., S. J. Bame, and S. Singer, all P-4

"Oxygen, Silicon, and Iron in the Solar Wind" by S. J. Bame, J. R. Asbridge, M. D. Montgomery, all P-4, and A. J. Hundhausen, T-12

"The Role of Heat Conduction in Non-Steady Solar Wind Phenomena" by M. D. Montgomery, P-4, and A. J. Hundhausen, T-12

"Time-Resolved Properties of Energetic Particles in the Flux Enhancements Associated with Inter-

planetary Shocks" by S. Singer and M. D. Montgomery, both P-4

"Electromagnetic Instabilities in the Solar Wind Due to Temperature Anisotropy" by D. W. Forslund, P-18

Presentation at the High Temperature Fuels Committee Meeting, Argonne National Laboratory, Ill., Dec. 8-10:

"LASL Contribution to 31st Meeting of High Temperature Fuels Committee" by J. O. Barner and J. L. Green, both CMB-11

Presentation at seminar, Princeton University, N. J., Dec. 10-11:

"X-Ray and ESR Studies of the Bonding in Metal Cluster Complexes" by C. E. Strouse, CMF-4 (invited)

Presentation at Physics Department Colloquium, University of New Mexico, Albuquerque, Dec. 11:

"Los Alamos Program in Project Sherwood" by J. A. Phillips, P-14

Presentation at Denver Section, Institute of Electrical and Electronic Engineers Meeting, Denver, Colo., Dec. 11:

"The Los Alamos Meson Physics Facility. A New Tool for Basic Research and Practical Applications" by L. Rosen, MP-DO (invited)

Presentation at seminar, Electrical Engineering Department, Texas Technological University, Lubbock, Dec. 14:

"Automated Cell Identification and Sorting" by J. A. Steinkamp, H-4 (invited)

Presentation to Navy Reserve Officers School, Los Alamos, Dec. 14.

"Interfacing of Real Time Computer Systems" by D. R. Machen, MP-1 (invited)

Presentation at Academy for Metals and Materials, American Society for Metals, Chicago, Ill., Dec. 14-16:

"Mechanics of Deformation, Yield Criteria, Metallurgy of Deformation, Mechanical Test Methods, Exact Forming Calculation, Material Flow, Decutality, and Failure" by J. A. Hockett, CMF-13

Presentation at Israel Atomic Energy Commission Soreq Nuclear Research Centre, International Workshop Meeting on Techniques and Problems of On-Line Isotope Separators, Yavne, Dec. 14-18:

"Preliminary Source Emission and Half-Line Studies Using a Moving Collector in a Mass Spectrograph" by S. J. Balestrini, N-2, L. Forman, J-16, and K. Wolfsberg, J-11

"The Godiva IV Burst Reactor On-Line Mass Separator Program" by L. Forman, J-16, S. J. Balestrini, N-2, and K. Wolfsberg, J-11

Presentation at Presidential Scientific Advisory Committee and Atomic Energy Commission General Advisory Committee briefings, Washington, D.C., Dec. 15-16:

"Research on Pulsed, High-Beta Systems" by F. L. Ribe, P-15

Presentation at the American Statistical Association Annual Meeting, Detroit, Mich., Dec. 27-30:

"Tests for Homogeneous Normal Populations in Hierarchical Designs" by R. K. Lohrding, C-5

Presentation at the 1970 Winter Meeting of the American Physical Society, Stanford, Calif., Dec. 28-30:

"Mach Reflection of Detonation Waves in Plastic-Bonded HMX" by S. D. Gardner, GMX-7

"Prospects for the Use of Pions and Muons in Medicine" by L. Rosen, MP-DO (invited)

"Potential Probe Measurements in a Thermally Driven Superfluid Helium Film" by D. H. Liebenberg, P-8

"Shock Wave Study of Liquid Chloroform, Cyclohexane and Hexane" by R. D. Dick and R. H. Warnes, both GMX-4

"Liquid and Solid He³ P-V-T Relations" by E. R. Grilly, P-8

Presentation at the Los Alamos Medical Center, Jan. 5:

"Uses of Carbon-13 for Medical Diagnosis" by E. Robinson, CMF-4 (invited)

Presentation at the American Society of Civil Engineers Meeting on Water

Resources Engineering, Phoenix, Ariz., Jan. 11-15:

"A Nuclear Energy Concept for Water Development" by L. P. Reinig, R. I. Brasier and B. J. Donham, all ENG-DO (invited)

Presentation at Pennsylvania State University, University Park, Jan. 12:

"Radiobiological Studies with Negative Pions" by D. F. Petersen, H-4 (invited)

Presentation at Interagency Mechanical Operations Group Joining Subgroup Meeting, Rocky Flats, Colo., Jan. 12-13:

"The Relationship of Weld Characteristics to Weld Parameters in Electron Beam Welding—A New Look" by D. J. Sandstrom, G. S. Hanks and F. F. Flick, all CMB-6

Presentation at Uranium-Alloys Meeting, Rocky Flats Division, Dow Chemical Company, Golden, Colo., Jan. 12-14:

"Elastic Moduli of Uranium" by J. E. Hockett, CMB-13

"Some Mechanical and Physical Properties of Heat Treated Alloys of Uranium with Small Additions of Ti or Mo" by D. J. Sandstrom and G. S. Hanks, both CMB-6

Presentation at local section, American Chemical Society, Midland-Odessa, Texas, Jan. 12; New Mexico State University, Las Cruces, Jan. 13; South Texas Section, American Chemical Society, Corpus Christi, Texas, Jan. 18; Texas A & M, College Station, Texas, Jan. 19; Brazosport Section, American Chemical Society, Lake Jackson, Texas, Jan. 20; Southeast Section, American Chemical Society, Houston, Jan. 21:

"The Chemistry of Explosives" by R. N. Rogers, GMX-2 (invited)

Presentation at Department of Engineering Science, Florida State University, Tallahassee, Jan. 13:

"Automated Cell Identification and Electronic Sorting" by J. A. Steinkamp, 4-H (invited)

Presentation at local American Chemical Society Meeting, Carls-

bad, N.M., Jan. 14 and Central New Mexico Section, American Chemical Society, Los Alamos, Jan. 15:

"Toy Explosives" by R. N. Rogers, GMX-2 (invited)

Presentation at Holloman Branch, The Scientific Research Society of America, Holloman Air Force Base, N.M., Jan. 15:

"Progress Report on LAMPF" by L. Rosen, MP-DO

Presentation at the Second International Atomic Energy Agency Panel on Peaceful Nuclear Explosions, Vienna, Austria, Jan. 18-22:

"Underground Engineering Explosive and Emplacement Considerations and Current U.S. Concepts" by R. L. Aamodt, J-DOT

Presentation at seminar, Physics Engineering Department, Cornell University, Ithaca, N.Y., Jan. 19:

"Review of Dense Plasma Focus Research" by J. W. Mather, P-7

Presentation at Los Alamos Subsection, Institute of Electrical and Electronics Engineers, Los Alamos, Jan. 19:

"An Overall Look at the LAMPF Control System" by R. A. Gore, MP-1

Presentation at Annual Luncheon, Hospital and Health Field auxiliaries and volunteers, Albuquerque, Jan. 21:

"Medical Applications of the LAMPF" by L. Rosen, MP-DO

Presentation at American Mathematical Society Meeting No. 682, Atlantic City, N.J., Jan. 21-25:

"Minimum Norm Differentiation Formulas with Improved Roundoff Error Bounds" by D. K. Kahaner, C-6

Presentation at Stevens Institute of Technology, Hoboken, N.J., Jan. 27 and National Bureau of Standards, Washington, D.C., Jan. 29:

"Ultralow Temperature Nuclear Physics" by J. R. Sites, P-8 (invited)

Presentation at seminar, Chemistry Department, University of Texas, El Paso, Jan. 29:

"Gas Phase Reaction Kinetics Studies by EPR" by H. G. Hecht, CNC-2 (invited)

20



years ago in los alamos

Culled from the March, 1951, files of the Los Alamos Herald by Robert Porton

Medical Research Laboratory Approved

Los Alamos will soon have a medical research laboratory which is expected to cost between \$1,500,000 and \$1,800,000. Advance notice of a call for bids on the project has been sent out for opening in April. LASL Health division programs in the building will include auto-radiology, biochemistry, cytology, pathology, microbiology and instrumentation.

New Tags Hung on Hill Places

The town council took action to rename several Los Alamos buildings and the high school athletic stadium. The area where Hilltop athletes perform will now be known as "Sullivan Field" in honor of the late community relations manager, Earle D. Sullivan. The Civic Auditorium was named the Albert J. Connell Auditorium, giving lasting recognition to the late founder of the Los Alamos Ranch School. The Lodge, Zia-operated hotel, was retagged "Fuller Lodge" as it was called when it was the main building of the school. The present East Cafeteria received the somewhat prosaic new title of "Recreation Hall."

Council of Community Agencies Formed

The Los Alamos Council of Community Agencies, long-planned here, became a reality. The council will be composed of representatives of Hill professional, civic and service groups. It will function to coordinate the civic, recreational and social efforts of local organizations. It will act as a clearing house of welfare problems in Los Alamos, provide the needed support or "push" to many community activities and eliminate duplication and overlapping of planned events here in the future.

Some Joke!

What police believe must be a warped sense of humor has resulted in a series of telephone calls to Hill residents in which the caller—a woman—has screamed hysterically for help. Four such calls were received late Saturday sending officers to homes of local citizens. The police blotter notes these as apparently from a "jokester."

what's doing

PUBLIC SWIMMING: High School Pool—Monday through Wednesday, 7:30 to 9 p.m., Saturday and Sunday, 1 to 6 p.m. Adult Swim Club, Sunday, 7 to 9 p.m. Women only, (sponsored by American Red Cross) Saturday, 12 noon to 1 p.m.

SIERRA CLUB: Luncheon meeting at noon, first Tuesday of each month, South Mesa Cafeteria. For information call Brant Calkin, 455-2468, Santa Fe.

RIO GRANDE RIVER RUNNERS: Meetings scheduled for noon, second Tuesday of each month at South Mesa Cafeteria. For information call Joan Chellis, 662-3836.

INTERNATIONAL FOLK DANCING: Every Tuesday, 8 p.m., Recreation Hall. For information contact Don Liska, 662-3665, or Roy Greiner, 672-9961.

LOS ALAMOS CONCERT ASSOCIATION: March 23, 8:15 p.m., Civic Auditorium: New York Woodwind Quintet. Membership drive, March 7 through March 23.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leaders for information regarding specific hikes.
March 14—Hot Springs or Pajarito Springs, Walter Green, 672-3203
March 20-21—Bandelier interior, Red Canyon, Dorothy Hoard, 672-3356
March 27-April 3—Big Bend raft trip, Ken Ewing, 662-7488

MOUNTAIN MIXERS SQUARE DANCING CLUB: For information call Mrs. Dee Seitz, 662-7356.
March 6—Canyon School, 8 p.m., Bones Craig, caller.
March 20—Canyon School, 8 p.m., Bill Kerr, Albuquerque, caller.

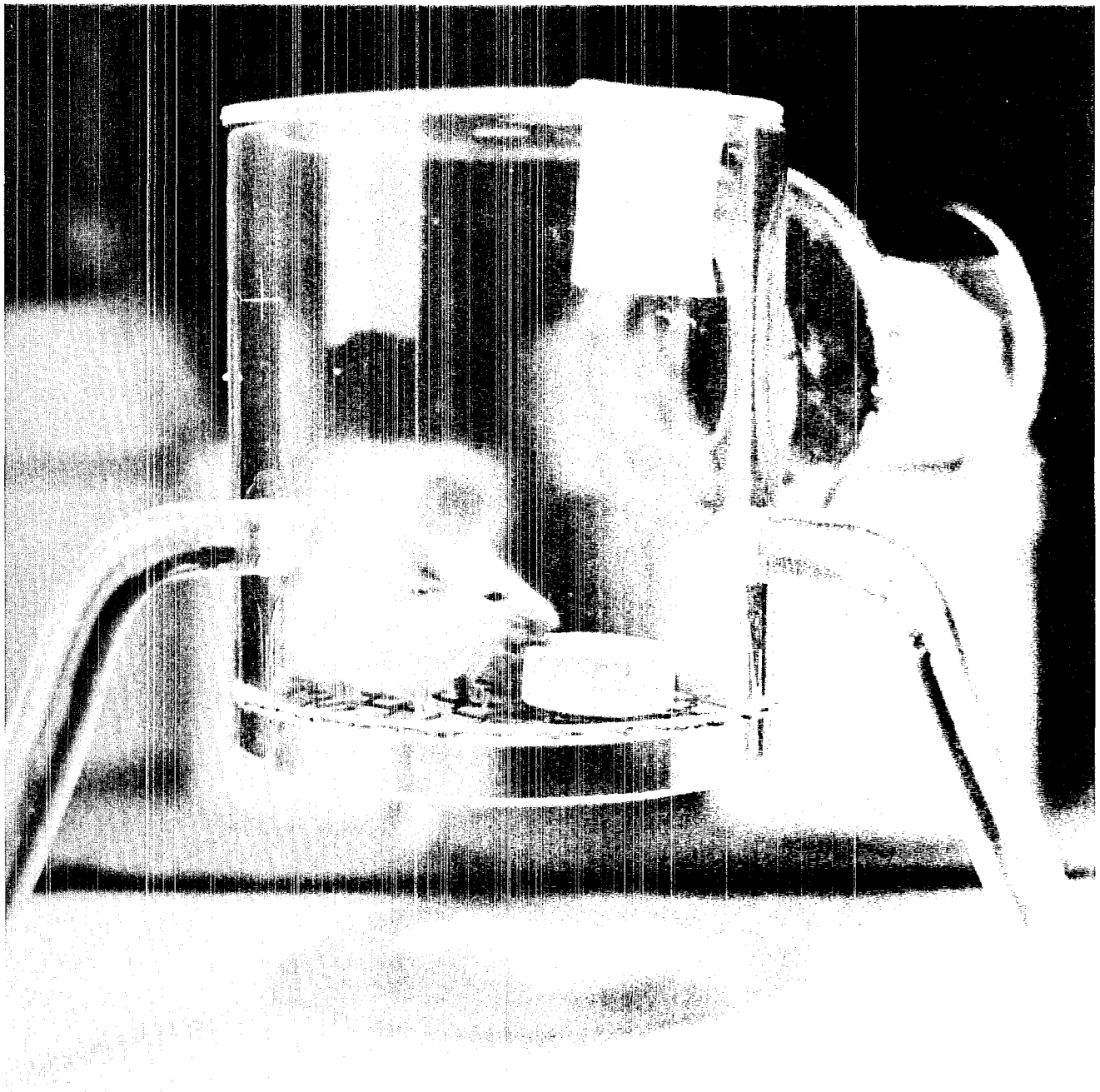
LOS ALAMOS FILM SOCIETY: "Dear John," 7:30 p.m., March 31, Civic Auditorium. Admission: members—\$.50, others, \$2.

MESA PUBLIC LIBRARY:

DISPLAYS:

March 3-30—pottery, Forrest Strong
March 3-17—crocheted hats, Faye Brown
March 1-21—Museum of New Mexico traveling exhibit, "Focus on History," southwestern Indian photography.
March 18-30—Girl Scout exhibit
March 22-31—Mesa Public Library prints
March 31-April 27—National Library Week exhibit

NEWCOMERS: March 20, "Ladies Night Out"—dinner and dance, Golf Club. Make own reservations. For information call Sally Jacoby, 662-4862.



A pair of mice was put on a diet of carbon-13 yeast pellets last month by H-4 scientists at the Health Research Laboratory. One of the them is shown here nibbling on a pellet. The two mice are the first to be fed yeast whose carbon content is greater than 90 per cent carbon-13. Purpose of the feeding program is to demonstrate that the isotope is not toxic to living systems, to enhance its production and to show its utility in basic research. According to Donald Ott, H-4 alternate group leader, eight more mice will eventually be put on the carbon-13 diet for about a year.

For a week, the LASL Shop department had a most attractive machinist. Sharon Shilling, SD-6 junior programmer for the department's numerically controlled machines, took a week's familiarization course on this milling machine to gain a better understanding of the problems involved in programming numerically controlled equipment. In the background are Edward Gritsko, SD-DO numerical control coordinator; Don Morrow, SD-DO administrative assistant; and Michael Hertrich, SD-1 machinist, who is the regular operator of the milling machine. Sharon also sat in on the recently completed machinist apprenticeship classes which were conducted over a nine month period.

